A STUDY OF DETERMINANTS OF QUALITY OF LIFE IN PATIENTS ON MAINTENANCE HEMODIALYSIS

DISSERTATION SUBMITTED IN THE PARTIAL FULFILLMENT OF THE UNIVERSITY REGULATIONS FOR THE AWARD OF

D.M DEGREE (NEPHROLOGY)

DIVISION OF NEPHROLOGY
PSG INSTITUTE OF MEDICAL SCIENCES & RESEARCH
THE TAMILNADU DR. M.G.R MEDICAL UNIVERSITY
GUINDY, CHENNAI, TAMILNADU, INDIA

AUGUST - 2013

CERTIFICATE

This is to certify that **Dr. T. Saravanan** has prepared this dissertation entitled **"A STUDY OF DETERMINANTS OF QUALITY OF LIFE IN PATIENTS ON MAINTENANCE HEMODIALYSIS"** under my supervision and guidance in PSG Institute of Medical Sciences and Research, Coimbatore in partial fulfillment of the regulations of **Tamil Nadu Dr. M.G.R Medical University** for the award of **DM Degree in Nephrology.**

Dr. S. Ramalingam MD.,
Principal
PSG IMS&R
Coimbatore – 641 004

Dr. G. Venu MD DM
Professor
Department of Nephrology
PSG IMS & R
Coimbatore – 641 004.

DECLARATION

I hereby declare that this dissertation entitled **"A STUDY OF DETERMINANTS OF QUALITY OF LIFE IN PATIENTS ON MAINTENANCE HEMODIALYSIS"** was prepared by me under the direct guidance and supervision of **Prof. G. VENU MD DM, PSG Hospitals, Coimbatore.**

The dissertation is submitted to the **Dr. M.G.R Medical University** in partial fulfillment of the University regulations for the award of DM Degree in Nephrology

Place:

Date:

ACKNOWLEDGEMENT

I wish to express my sincere thanks and gratitude to my Professor **DR. G. VENU MD DM.,** Department of Nephrology, PSG Institute of Medical Sciences & Research for his guidance and encouragement all along in completing my study.

I am grateful to the **Principal** and **Medical Director**, PSG Hospitals for permitting me to carry out this study.

I thank Residents in Dialysis and wards, OPD staffs and Dialysis Technicians in helping me in this study and also thank all the patients for the kind cooperation.

And most of all I express my gratitude to my family and my friends who helped me all the way through.

TABLE OF CONTENTS

AIM OF THE STUDY

To identify the factors associated with quality of life in patients on maintenance hemodialysis.

Introduction

Chronic kidney disease (CKD) and end stage renal disease (ESRD) have become worldwide public health problems. Both of these conditions increase the patient morbidity and mortality risks and produces major economic strain on the health-care systems. The average incidence of chronic kidney disease stage 5 (CKD5) in developing countries is 150 per million population and in India it has been estimated to be 175 – 225 per million population.[1] The incidence rates of ESRD have been on the increase from 49.9 patients per million population in 2000 to 63.8 patients per million of population in 2006, an almost 28% increase over a 6 year period.[2] In India, the incidence of CKD5 is increasing, but due to socioeconomic limitations only 10% of these patients receive renal replacement therapy .[3]

As per the 5 year cumulative annual report of CKD registry of India presented in 41st Annual Conference of Indian Society of Nephrology, around 50% of patients reported to have CKD were in stage5 CKD (CKD5) and 62% of these reported patients in CKD5 were treated in conservative line, 39% receive maintenance hemodialysis (MHD), 4.5% receive continuous ambulatory

peritoneal dialysis (CAPD) and 2% receive kidney transplantation as their renal replacement therapy. So MHD remains the preferred modality of renal replacement therapy by most of the patients.

Various advances have taken place in the field of hemodialysis over the past two decades, but the quality of life in hemodialysis patients is poor and needs improvement. Previous studies have shown that hemodialysis is associated with complications like depression, cognitive impairment in the form of memory loss leading on to a poor quality of life.[2] The complications of CKD like anemia, malnutrition, increased susceptibility to infection and increased rate of cardiovascular events further decreases the quality of life in these patients. To achieve an improvement in quality of life (QOL), it is required to identify factors that contribute for poor QOL.[17,47,48] Of these factors, many are potentially modifiable, if modified might reflect with improvement in QOL. This study was conducted to assess the determinants of quality of life in maintenance hemodialysis (MHD) patients.

REVIEW OF LITERATURE

Hemodialysis is a process of removal of the toxins accumulated in the patient's body as a result of either complete or incomplete loss of functioning kidney. This is performed by two processes diffusion and convection. The former one is the predominant way of solute clearance in intermittent hemodialysis performed 2 – 3 times per week. The patient survival remains considerably low in patients on maintenance hemodialysis when compared to the renal transplant recipients. Various factors related to the patient and the procedure determines the quality of life and patient survival. So measures to improve the quality of life and patient survival have to be sought for on a continuous basis in all hemodialysis units. Bodies like Kidney Disease Outcomes Quality Initiative (KDOQI)[4] and Kidney Disease: Improving Global Outcomes (KDIGO)[5] had published clinical practice guidelines with a set of targets to be achieved in various aspects of hemodialysis like dialysis adequacy, anemia control, and mineral bone disease in management of CKD patients.

The Review of literature pertaining to our topic revealed various types of assessments of the quality of life with usage of various clinical targets as outcome determinants. Many of the patients on MHD suffer from impaired cognitive functioning, unhealthy physical, mental, and social aspects of life that affect the simplest activities of daily life[6] and the patients with poorer QOL score have increased mortality risks.[7] Similar studies in the past have shown that

an improvement in QOL reduces the complications associated with this disease, or at least makes them more tolerable.[2]

Due to financial constraints faced by the people in India , many patients ask for twice weekly dialysis schedule, reuse of dialyzers and have problems in compliance with the prescribed medicines especially erythropoietin.[8] So anemia, malnutrition are the main reasons for impaired QOL in the subset of population. This study is conducted to assess the impact of various demographic, clinical and biochemical variables on the QOL of the patients.

Anemia in hemodialysis

Prevalence of anemia is high in patients on maintenance hemodialysis. Many symptomatology in ESRD patients like depression, fatigue, decreased exercise tolerance and cardiovascular consequences, such as left ventricular hypertrophy (LVH) and left ventricular systolic dysfunction were explained by anemia. [9] An association with an increased risk of morbidity and mortality principally due to cardiac disease and stroke was also shown.[10-13] The prevalence of absolute and functional iron deficiency is high in patients with CKD and increases once the patient is started on erythropoiesis stimulating agents (ESA). This is due to the increment in iron requirement that happens after initiation of ESA. The National Kidney Foundation (NKF) Dialysis Outcomes Quality Initiative (KDOQI)

guidelines for the anemia 2007 update for the hemoglobin (Hb) target recommends that the selected Hb target should generally be in the range of 11 to 12 g/dL in all patients with CKD [14]. They also recommend that the Hb target should not exceed 13 g/dL.

The main reason for high prevalence of anemia in spite of the usage of ESAs is iron deficiency. The dialysis patient has an estimated iron loss of 2gm per year principally through bleeding, blood drawing, and/or, most important with hemodialysis, the dialysis treatment itself. There are two types of iron deficiency that happens in patients on MHD – Absolute and Functional Iron deficiency.

Absolute iron deficiency is a condition of low iron stores in the body as reflected by low serum ferritin level of less than 200 ng/ml in hemodialysis patients with low transferrin saturation (TSAT) of less than 20% calculated by formula as follows.[15]

TSAT = Plasma Iron / Total iron binding capacity (TIBC) X 100

Functional iron deficiency is characterized by the presence of adequate iron stores, but an inability to sufficiently mobilize this iron to support increasing erythropoiesis that happens with the administration of erythropoietin (EPO). The serum ferritin level is either normal or markedly elevated (greater than 200 ng/ml) but the transferrin saturation (TSAT) typically below 20 percent.[16]

In a similar study conducted in the past, patients with higher hemoglobin levels had statistically significant positive correlation with higher QOL scores [3, 17 and 18.] Erythropoietin usage in patients with anemia has been showed to improve the QOL score and exercise tolerance in MHD patients.[19] We sought to see if any difference in QOL scores in patients with and without anemia, and subgroup analysis with those with absolute iron deficiency and functional iron deficiency, those on erythropoietin and not on erythropoietin.

Nutrition in Hemodialysis

Malnutrition is estimated to occur in 20 to 70 percent of patients and depends on the method of assessing nutritional status) and longer dialysis vintage (length of time in months or years spent on dialysis) is associated with faster decline in nutritional parameters of the patient.[20,21] The most common and easily treatable cause for malnutrition in patients on maintenance dialysis is under dialysis – leading on to decreased taste acuity and anorexia secondary to uremia.

The other causes of malnutrition in adequately dialyzed patients are:

1. Nutrients losses into the dialysate. The average protein loss can vary from 4 to 8 gm/day with renal replacement therapy like hemodialysis. Certain reuse procedures result in increased losses of protein into dialysate. Protein loss may go up to 20 grams in one hemodialysis session has been reported with polysulfone dialyzers reused with bleach. [22,23]

2. Occult systemic illness producing an inflammatory response which increases the energy expenditure, pro-inflammatory cytokine levels, and oxidative stress provide a link between inflammation and malnutrition.[24-26]

3. Dietary restrictions particularly salt restriction can make food less palatable. Furthermore, the encouragement to restrict fluid intake to minimize interdialytic weight gain may lead to a concurrent decrease in caloric intake.[27]

4. Usage of bio-incompatible membranes may increase the protein losses.

5. Persistent metabolic acidosis increases the protein degradation and amino acid oxidation.[28]

6. Some medications, such as phosphate binders, can impair nutrient absorption.

The presence of malnutrition is not only relevant to the nutritional status of the patient but also closely intertwined with the inflammation and cardiovascular morbidity and mortality.[29]

There are various indicators of nutritional status in hemodialysis patients like serum albumin level, serum transferrin level, serum prealbumin level and normalized protein nitrogen appearance (nPNA).[30] Of these markers, serum albumin and nPNA were used in our study to predict malnutrition.

1. Serum albumin level

It is accepted to be one of the important markers of malnutrition in CKD patients especially on MHD. Lower albumin level has been shown to be a predictor of low QOL[3, 17, 18] As per the NKF-KDOQI guidelines for nutrition published in 2000; the target level of serum albumin in a predialysis sample was 4 gm/dl for the brom-cresol method of estimation. The problem with usage of albumin as a marker of malnutrition is its lack of specificity in chronic inflammation. [58]

2. Protein nitrogen appearance (nPNA)

It is widely misunderstood that the patients with low predialysis blood urea levels (Pre-BUN) are due to a good solute clearance happening with good hemodialysis. Patients with low predialysis blood urea nitrogen (Pre-BUN) might be secondary to two reasons. First is due to an adequate dose of dialysis producing a good urea clearance and second reason is due to the fact that patient is inadequately dialyzed and protein intake of the patient is low secondary to anorexia and altered taste which is caused by uremia. This is a situation where in one condition needs to be differentiated from the other condition for implementing corrective measures. This differentiation can be done by calculating the normalized protein equivalence of nitrogen appearance (nPNA), as an index of protein intake. This is also known as the normalized protein catabolic rate (nPCR).

Protein nitrogen appearance is a measure of the interdialytic appearance of urea in body fluids in addition to any urea lost in the urine in patients with residual renal function. It is an estimate of protein intake by the patient which can be calculated by using the following formulas. The correlation is good if the patient is not catabolic or anabolic. nPNA values of more than 1.2 and albumin level more than 3.5mg/dl has been shown to predict hospitalization and mortality in patients on MHD.[31]

The National Cooperative Dialysis Study (NCDS) established that the timed average urea concentration and the protein catabolic rate (nPCR) were important determinants of morbidity and mortality in hemodialysis patients. [32]

The PNA in patients treated with hemodialysis is calculated as follows [33]

$$\text{nPNA, in g/kg per day} = 0.22 + \frac{(0.036 \times \text{ID rise in BUN} \times 24)}{\text{ID interval (hrs)}}$$

Where the interdialytic (ID) rise in BUN is the difference between the pre-BUN of the present session and the post-BUN of the previous dialysis session and the ID interval is calculated in hours as the time in between the previous session and the present session. A total of three readings of PCR were calculated and the mean was taken.

The patients with significant residual renal function (assumed by having a urine output of greater than 100ml/day) were expected to have a significant amount of

nitrogen losses in the urine and the same was accounted for by adding the value derived out of the following formula

The value derived out of the following formula was added to the nPCR value.

$$\text{Total Urinary nitrogen loss in ID period} = \frac{\text{Urinary urea nitrogen (g) x 150}}{\text{ID interval (hrs) x weight (kg)}}$$

Where the urinary urea nitrogen is the amount of the urea nitrogen excreted in a urine collection obtained during the interdialytic interval.

As per the European and American hemodialysis guidelines, the target nPNA is 1.0 to 1.2g/kg/day or higher.[34, 35]

Similar studies in the past have shown positive correlation of higher albumin levels with higher QOL scores.[3,17]

3. Serum Creatinine level

The Predialysis serum creatinine gives an estimate of the sum of dietary intake of creatine and creatinine rich foods and the endogenous production from muscle breakdown minus the extracorporeal removal, urinary excretion secondary to the tubular secretion. So individuals with low predialysis serum creatinine less than 10mg/dl should be suspected for malnutrition and further worked up to rule out the same. Excess mortality risk was shown to be associated with low predialysis creatinine level lesser than 9 to 11 mg/dl.[59]

Dialysis adequacy

KDOQI guidelines for hemodialysis adequacy recommend at least monthly assessments of delivered doses for timely diagnosis of under dialysis and pursuance of corrective measures.[4] The most comprehensive way of measuring dialysis adequacy is urea kinetic modeling. Urea kinetic modeling is method used for verification of the equivalence between the prescribed dialysis (the prescribed Kt/V) and dialysis delivered (the effective Kt/V). It also gives an estimate of urea generation, a marker of the protein catabolic rate and protein intake

Kt/V is defined as the clearance of urea by the dialyzer (K, provided by manufacturer in mL/min which needs periodic verification by the dialysis personnel) multiplied by the duration of the dialysis treatment (t, in minutes) divided by urea's distribution volume in the body (V, in mL), which is approximately equal to the total body water.

This correction of total urea removal (Kt) to the volume of distribution is essential because, the weight and the body surface area difference might change with individual to individual. So for example 150 ml of urea clearance might be adequate for a small framed patient but inadequate solute removal in a large patient. Two types of kt/v measurements are available (single pool kt/v and equilibrated kt/v). The difference between the two types is as follows. Single-pool kt/v considers the distribution volume of urea as single but the equilibrated

kt/v considers the distribution volume of urea as two compartments and includes the correction of the equilibration that happens between the two compartments.

As stated in the 2006 K/DOQI guidelines, the preferred method for measurement of the dialysis dose is by formal kinetic urea modeling .[4] There is no universally accepted target value for the Kt/V. The 2006 K/DOQI clinical practice guidelines suggest that the minimally adequate dose of dialysis is achieving spKt/V of 1.2 per dialysis in patients on thrice weekly dialysis without residual renal function (eGFR<2ml/mt) and the target dose is spKt/V of 1.4 per dialysis session without significant residual renal function also recommend that the minimum session spKt/V can be reduced in patients with minimal residual renal function (greater than 2 mL/min per 1.73 m2). This recommendation was based on the conclusion of the landmark trial in the area called HEMO study which was performed in 1846 patients.

Studies in the past have showed higher QOL scores in patients achieving the target adequacy measures (Kt/V) [36, 37]. So we measured spKt/V in our patients in three consecutive sessions and taken a mean of the values and correlated with the QOL scores.

Mineral bone disorder in CKD

Chronic kidney disease is associated with various abnormalities in homeostasis of calcium (Ca), phosphorus (Pi), vitamin D and parathormone (PTH) with subsequent deleterious effects on bones and vasculature.

The pathophysiology of bone disease is secondary to

(1) Decline in GFR with decreased phosphorus excretion leading to hyperphosphatemia
(2) Decreased synthesis of calcitriol (dihydroxyvitamin D_3) or in the failing kidneys
(3) Secondary hyperparathyroidism with high parathormone levels
(4) Hypocalcemia secondary to decreased absorption in gastrointestinal tract due to decreased calcitriol levels.

The bone disease varies from high turnover bone disease to low turnover bone disease. High turnover bone disease or osteitis fibrosa cystica is caused by high PTH levels with loss of tensile strength of bone making it more susceptible for fractures. On the other end of the spectrum is the adynamic bone disease characterized by reduced bone volume and mineralization caused due to oversupression of PTH levels with calcitriol. In addition to the changes in bone metabolism, abnormal calcium phosphorus homeostasis also leads to extraosseous calcification in soft tissues and vessels.

High phosphorus levels have been shown to be a predictor of morbidity and mortality in maintenance hemodialysis patients.[38,39]

In a large US based study conducted in hemodialysis patients, an association between high calcium phosphorus product (Ca-Pi) and risk of death was showed. [38] The available evidence is convincing that the outcomes like increased death rate and extra skeletal calcification are related to Ca-Pi product once the product exceeds 55. The goal level of Ca-Pi product should be below 55. In a similar study conducted by veerappan et al, there was a tendency of lower QOL scores with increased calcium and phosphorus levels.[3] Hyperphosphatemia, hypercalcemia, elevated Ca-Pi product, calcitriol deficiency and increased PTH levels are probable contributors for high incidence of cardiovascular mortality

As per KDOQI clinical practice guidelines for Bone Metabolism and Disease in Chronic Kidney Disease published in 2003, the target serum Pi is less than 5.5mg/dl, the serum Ca should be maintained within the normal range (8.4 to 9.5 mg/dl) and the Ca-Pi product of less than 55.[40]

So we sought to see the correlation of QOL scores with the different levels of serum calcium (Ca), serum phosphorus (Pi) and calcium-phosphorus product (Ca-Pi) product.

Demographic variables

The variables like age, sex, duration of dialysis, economic status, educational status, marital and employment status are known to have an effect on the QOL experienced by the patient. In the previous studies, older patients and female sex are the groups shown to have lower QOL scores.[3, 17, 18, and 41]

Patients, who are educated, employed and those with better economical status have been shown to have better QOL score.[17, 18]

Dialysis vintage is referred to the length of time on dialysis in months or years. Usually it is expected to be a negative predictor of QOL since the propensity of patients to develop complications like vascular access failure is high in long term. But studies conducted in the past had showed mixed results. Some studies showed association of longer dialysis vintage with higher QOL scores in some studies [3] and with lower QOL scores in some studies.[41]

Travel time to the dialysis centre has been shown to have a negative impact on QOL scores in the previous studies.[3, 42] Marital status has been shown to have a positive impact on QOL scores in some studies.[17]

Clinical variables like type of the native kidney disease and the number of co morbidities are known to affect the QOL scores, since they affect the health of the patient in a negative manner. Previous studies have shown that patients with native kidney disease of diabetic nephropathy have poor QOL scores compared

to other causes for ESRD.[41]The number of co morbidities has an inverse correlation with the QOL scores was showed in some studies .[17]

Serological status and vascular access

Chronic Hepatitis C virus (HCV) infection is one of the potential problems arising globally in hemodialysis units with a mean prevalence of 13.5% and varies across countries ranging from 2.6% to22.9%.[43] Not only adding on to the co morbidities, a recent meta-analysis shows that anti-HCV positive status is an independent and significant risk factor for death. Evidence from previous studies shows that QOL scores especially in the mental aspects is substantially impaired in anti-HCV positive patients.[44]

Chronic Hepatitis B virus (HBV) infection is also a potential problem with a recent study showing a prevalence of 16.8 percentages in hemodialysis patients [45]. But the QOL studies in hemodialysis patients with hepatitis B infection were searched and not able to be traced. Studies in patient population with HBV infection (not on hemodialysis) showed that QOL scores were less in the patients with advanced disease.[46]

Vascular access for hemodialysis is the lifeline for patients on maintenance hemodialysis. Access related complications remain one of the most important causes for hospitalizations and morbidity. Previous studies have shown that patients with current access with double lumen catheter use for hemodialysis had lower QOL scores.[3, 17, and 37]

MATERIALS AND METHODS

This was a cross-sectional study conducted in a tertiary maintenance hemodialysis unit in patients who were on maintenance hemodialysis for a period more than 3 months. The dialysis prescription was empiric and the frequency of the dialysis sessions was decided by the clinical status of the patient. The patients with recent acute ailments like severe sepsis, trauma or fractures were excluded from the study. The inclusion criteria were: ESRD patient who were aged 18 years or more; on regular twice or thrice weekly hemodialysis and able to provide informed consent. An informed consent was obtained from the participating patients. Ethical approval was obtained from the In-hospital/Institutional ethical committee. Clinical information was collected by a study co-coordinator and entered in a proforma that is attached.

Assessments

1. Demographic information (age, sex, educational status, financial and marital status), information regarding the duration of time to reach the dialysis centre, dialysis vintage, co-morbidity index, native kidney disease were collected by interview with the patients and review of the medical records of the patient.

2. Blood samples were drawn predialysis and post dialysis according to the recommendation by KDOQI following slow-flow methods (reducing the blood flow rate to 100ml/mt and sampling after waiting for 15 seconds). spKt/V was

calculated from using predialysis and post dialysis urea levels, post dialysis weight of the patient, ultra filtration volume and calculated using the daugirdas formula fed into a computer.[49] The same procedure is repeated in three consecutive hemodialysis sessions and the mean value was taken into account.

3. Protein nitrogen appearance (nPNA) was calculated using the Gotch formula.[50] The patients with residual urine output greater than 100ml/day were selected and asked to collect the urine passed during the interdialytic period. Urine urea levels were calculated and the PNA value was corrected for patients with residual kidney function using the formula mentioned in review of literature.[51]

4. Biochemical studies performed were markers of nutrition like serum albumin measurement, anemia profile including the serum hemoglobin (Sr.Hb), serum ferritin, serum transferring saturation (Sr.TSAT) was calculated from the measurements of serum iron and total iron binding capacity.

5. Information regarding erythropoietin use, serological status, catheter use were obtained from the records in the dialysis unit, absolute iron deficiency (AID) was defined as serum ferritin < 200, Sr.TSAT < 20, functional iron deficiency (FID) was defined as serum ferritin >200, Sr.TSAT < 20.

6. We arbitrarily divided the total sample size into groups' bases on their demographic and clinical characteristics and the QOL scores were compared in between the groups.

Bio- Chemical analysis

All biochemical analysis was performed with fully automated Cobas Integra analyzer Model 400. Blood urea and urine urea level was measured using the principle of Kinetic test with urease and glutamate dehydrogenase method. Creatinine estimation was done by buffered kinetic jaffe reaction without depolarization. Serum iron was measured by guanidine/Ferro Zine method. Serum ferritin was estimated using electrochemiluminescence immunoassay. Unsaturated iron binding capacity was estimated using direct determination using Ferro Zine method. Total protein was estimated using the principle of Biuret reaction (divalent copper reacts with peptide bonds of protein to produce a change in color which was read with colorimeter. Serum albumin estimation was done using modified brom cresol green binding assay. Calcium level was measured by schwartzenbach with o-cresolphthalein complexone method. Inorganic phosphate was measured was estimated with endpoint method with sample blanking method. Hemoglobin estimation was performed by Beckman Coulter analyzer LH 750. Anti-HCV, anti-HIV, hepatitis B surface antigen (HbsAg) was performed by chemiluminescence method.

Instrument for assessing QOL

Quality of life was assessed by world health organization QOL questionnaire (WHOQOL-BREF). The same was used in a validated Tamil version.[52] The instrument was used after obtaining the permission from WHO. The questionnaire was filled up by the patients within a period of one month from the clinical data entry.

Four domains are defined for the WHOQOL-BREF, based on its 24 items:

1. **Domain 1**- physical health domain, includes questions on activities of daily living, dependence on medicinal substances and medical aids, energy and fatigue, mobility, pain and discomfort, sleep and rest, and work capacity.
2. **Domain 2** - psychological health domain, includes questions on bodily image and appearance, negative feelings, positive feelings, self-esteem, spirituality, religion, personal beliefs, thinking, learning, memory, and concentration.
3. **Domain 3**, social health domain includes questions on social relationships, covers personal relationships, social support, and sexual activity.
4. **Domain 4**, environment health domain, includes questions on financial resources, freedom, physical safety and security, home environment,

physical environment (pollution, noise, traffic, and climate), and transport.

Scoring of WHOQOL-BREF

The questionnaire was scored after its administration to the study subjects and then the raw score of each domain was then transferred to standardized score of 4 to 20, in order to maintain uniformity in the scores. The method of inferring the score is available elsewhere.[52] Higher scores means better quality of life of patients. The QOL scores of each domain and the Total QOL score were compared between the groups of the patients.

Validation of WHOQOL-BREF questionnaire

The World Health Organization Quality of Life (WHOQOL – 100 with 100 items and shorter version WHOQOL –BREF with 26 items are cross-culturally validated generic instruments available in 30 languages, including Hindi and Tamil, and the scale was developed across 15 centers internationally.[52] The WHOQOL scales are the second most commonly used health related quality of life (HRQoL) instrument in the world.[53]

Statistical Methods:

1. Descriptive statistics were reported as number and percentages for categorical variables, mean and SD for continuous variables.
2. Normality of the data was checked.
3. Independent t test or ANOVA for the parametric and Wilcoxon rank sum test or Kruskal Wallis test for non-parametric was used to compare the QOL between the groups.
4. Pearson or Spearman's Rank Correlation was used to assess the relationship between quality of life and clinical characteristics, as appropriate.
5. Statistical analysis was done using SPSS software version 18.
6. Probability value less than 5% was considered as statistically significant.

RESULTS

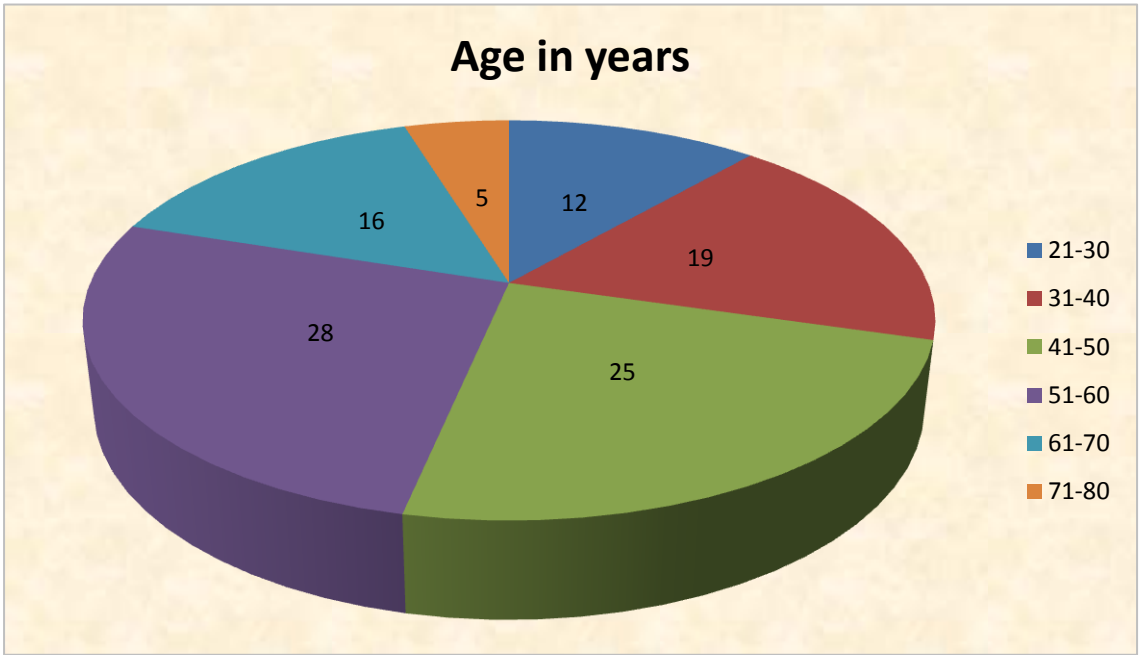
Study design: An observational clinical study with 105 patients is undertaken to study the Quality of life of hemodialysis patients

Table 1: Age distribution of patients studied

Age in years	Number of patients	%
21-30	12	11.4
31-40	19	18.1
41-50	25	23.8
51-60	28	26.7
61-70	16	15.2
71-80	5	4.8
Total	105	100.0

Mean ± SD: 48.28±13.00

Figure - 1

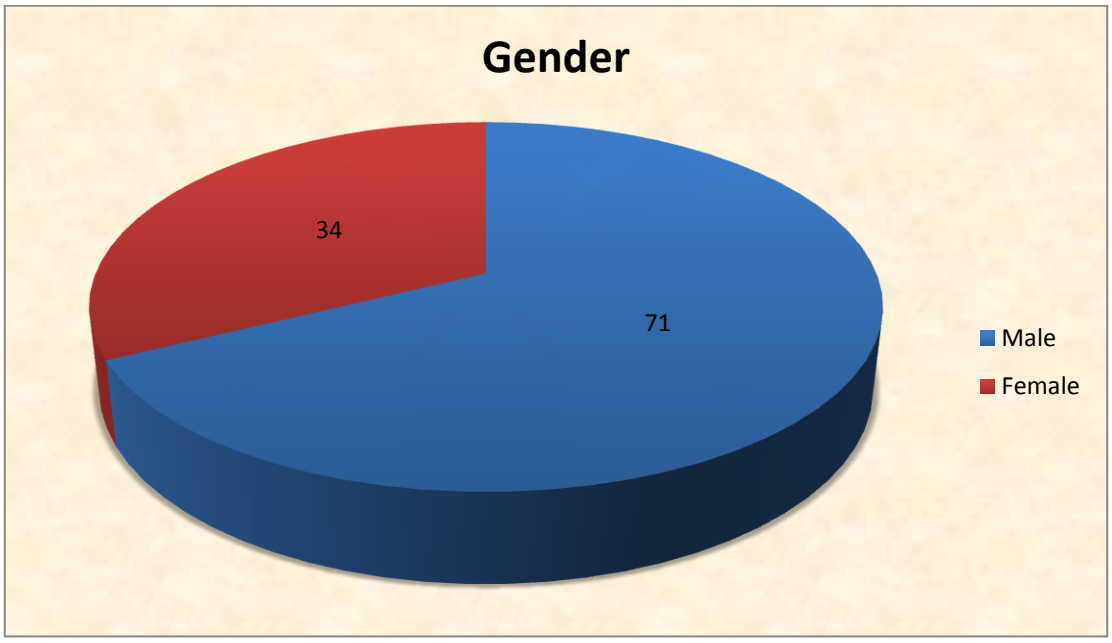


Baseline Characteristics

Table 2: Gender distribution of patients studied

Gender	Number of patients	%
Male	71	67.6
Female	34	32.4
Total	105	100.0

Figure - 2

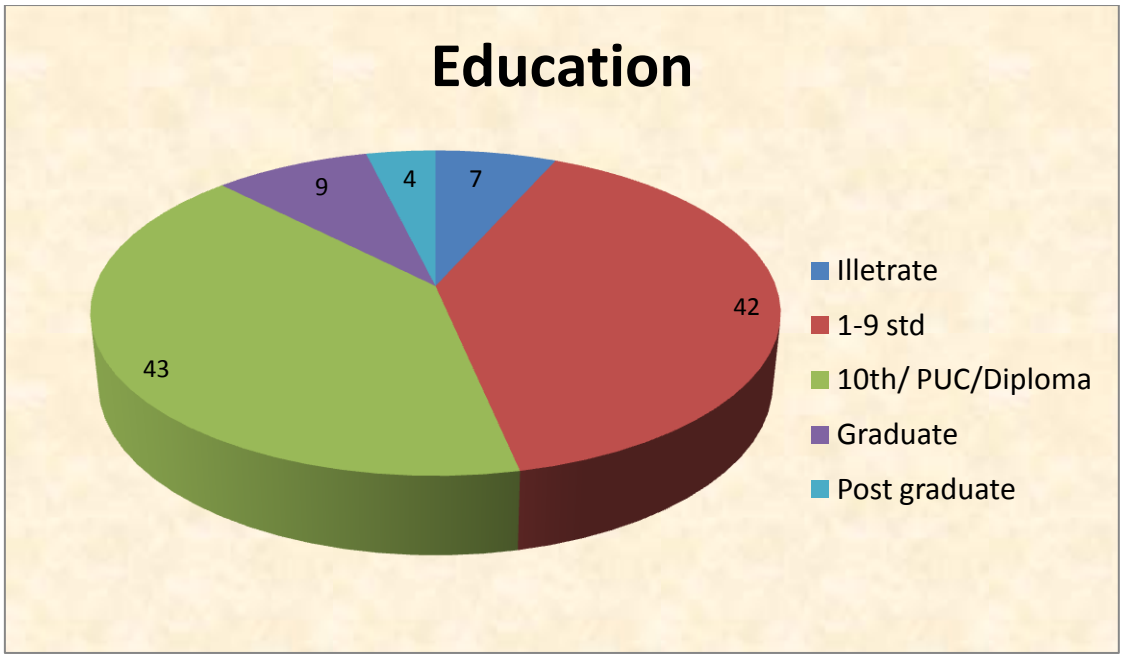


Baseline Characteristics

Table 3: Education distribution of patients studied

Education	Number of patients	%
Nil	7	6.7
1-9	42	40.0
10th/PUC/Diploma	43	40.9
Graduate	9	8.6
Post graduate	4	3.8
Total	105	100.0

Figure - 3

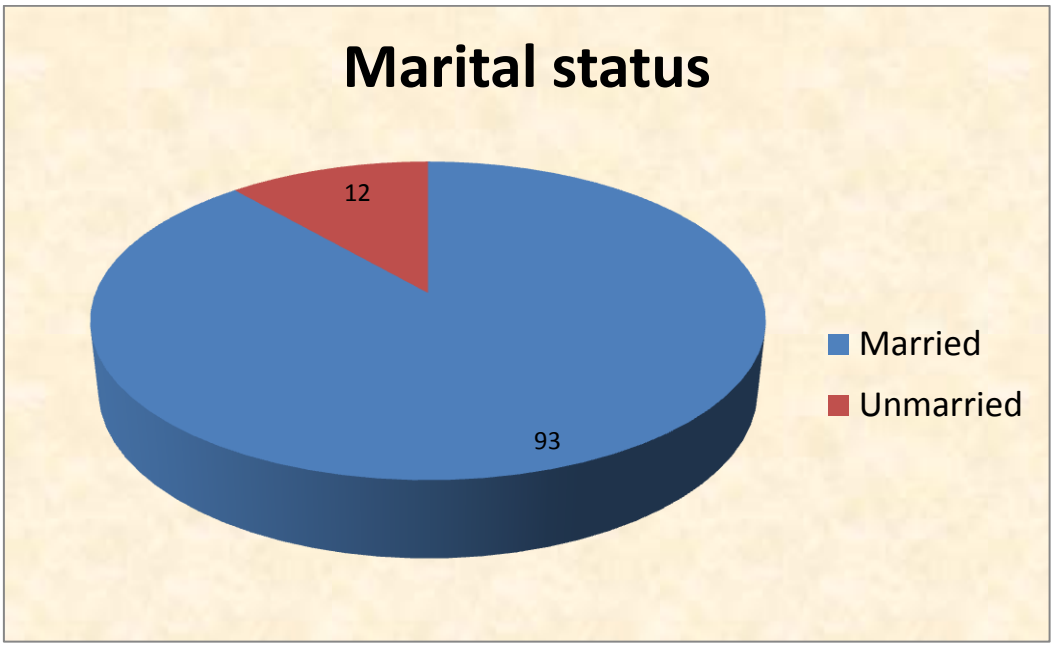


Baseline Characteristics

Table 4: Marital status

Marital status	Number of patients	%
Not married	12	11.4
Married	93	88.6
Total	105	100.0

Figure - 4

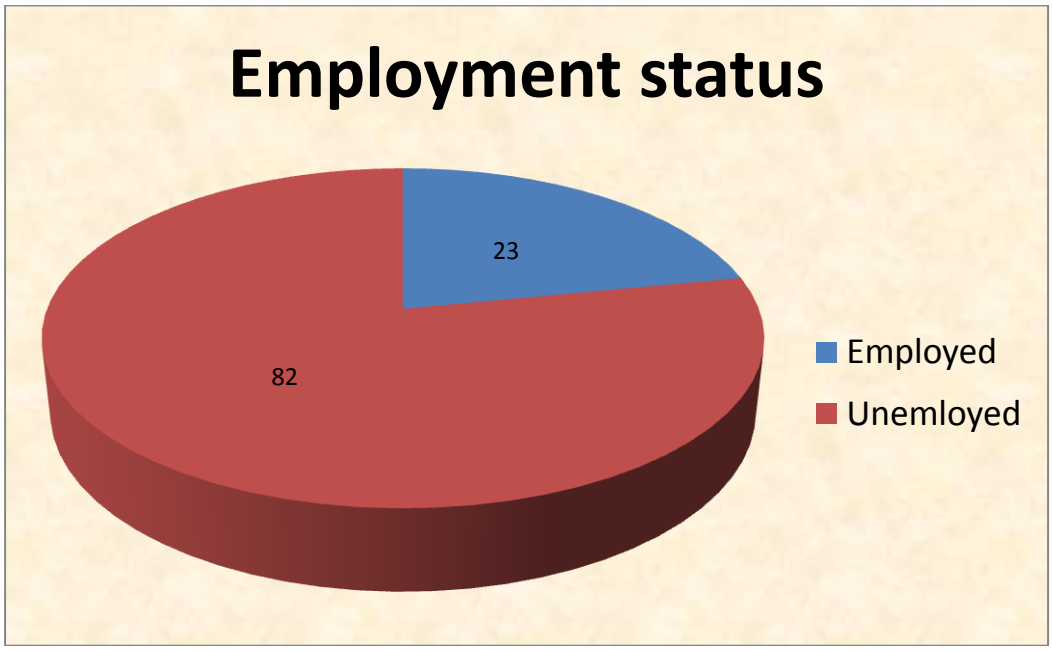


Baseline Characteristics

Table 5: Employment status

Employment status	Number of patients	%
Not employed	82	78.1
Employed	23	21.9
Total	105	100.0

Figure – 5

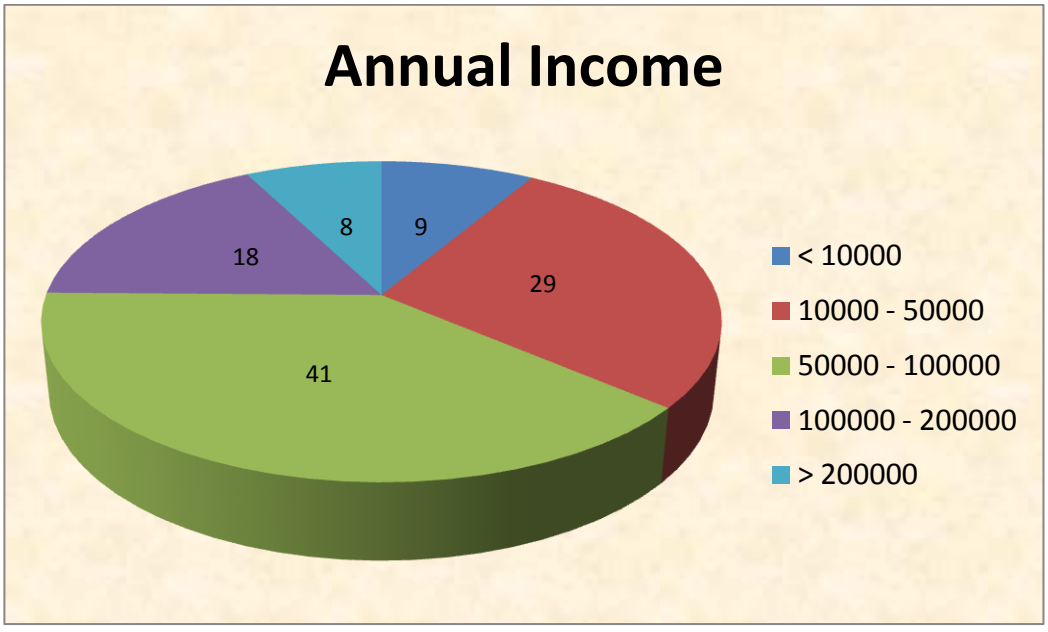


Baseline Characteristics

Table 6: Income in Rupees

Income in Rs	Number of patients	%
<10000	9	8.6
10000-50000	29	27.6
50000-100000	41	39.1
100000-200000	18	17.1
>200000	8	7.6
Total	105	100.0

Figure - 6

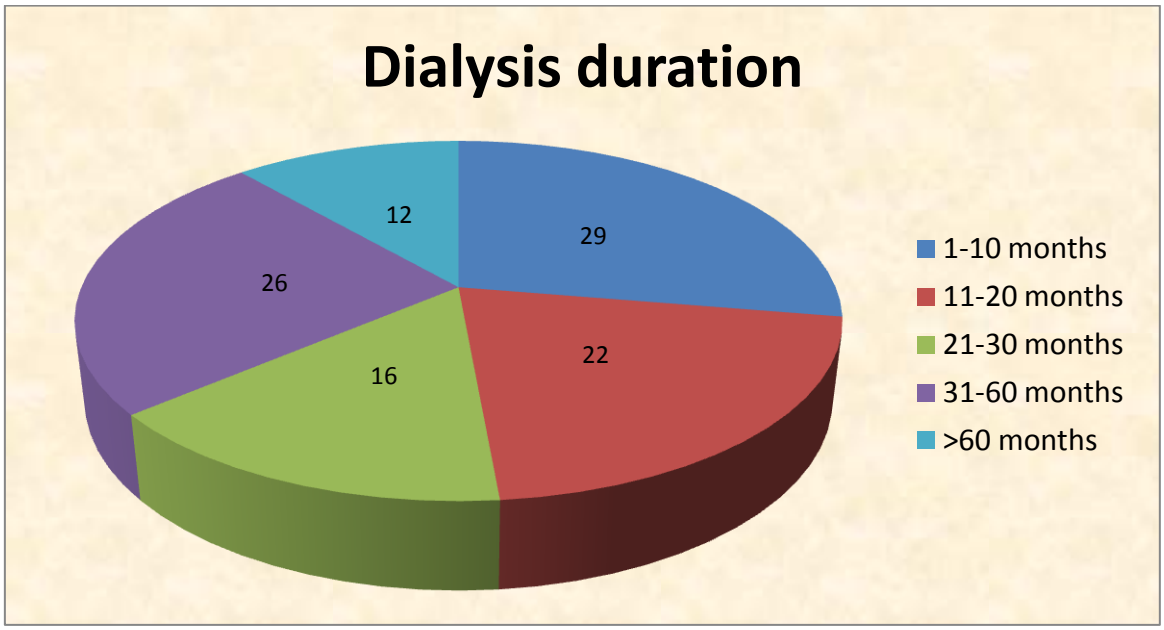


Baseline Characteristics

Table 7: Duration of dialysis in months

Duration in months	Number of patients	%
1-10	29	27.6
11-20	22	20.9
21-30	16	15.2
31-60	26	24.8
>60	12	11.4
Total	105	100.0

Figure - 7

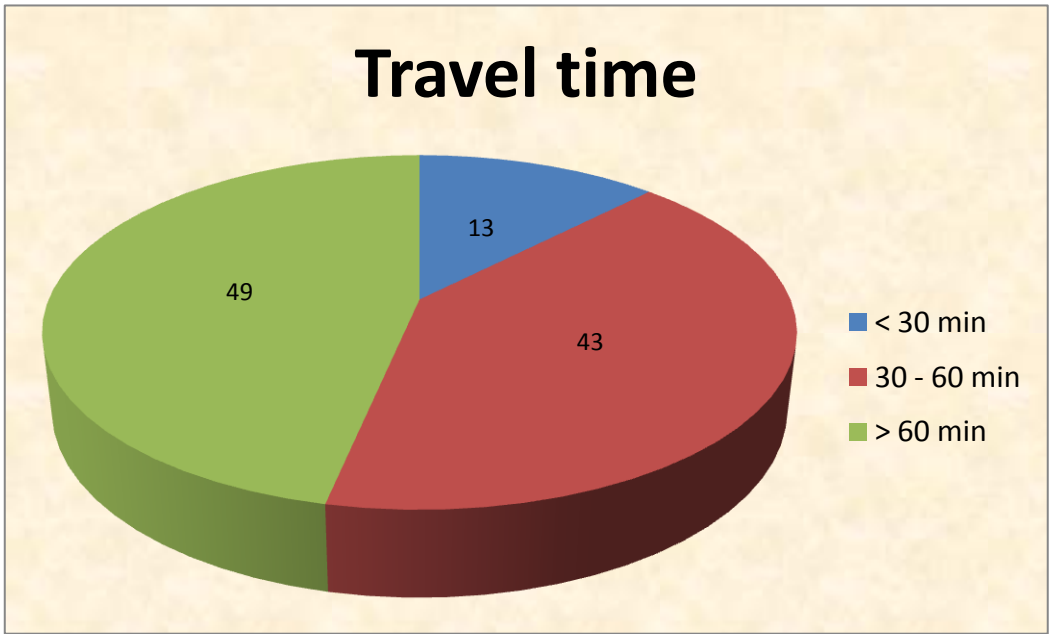


Baseline Characteristics

Table 8: Travel time

Travel Time	Number of patients	%
< 30 min	13	12.3
30 – 60 min	43	40.9
>60 min	49	46.6
Total	105	100.0

Figure - 8

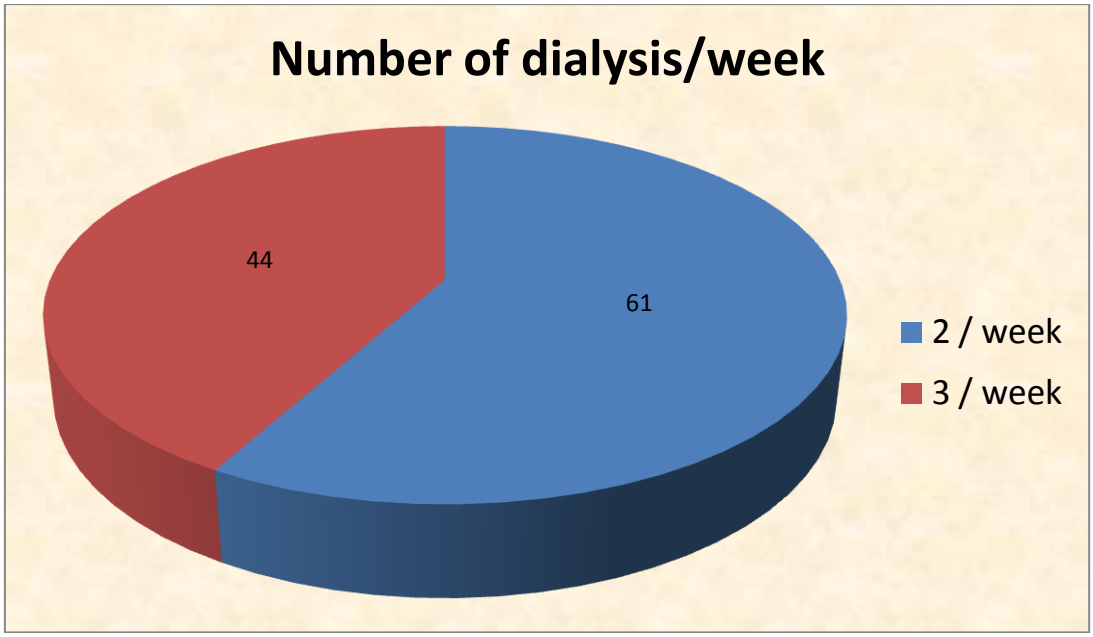


Baseline Characteristics

Table 9: Frequency of dialysis per week

Dialysis frequency	Number of patients	%
2 / week	61	58.10
3 or more / wk	44	41.90
Total	105	100.0

Figure - 9

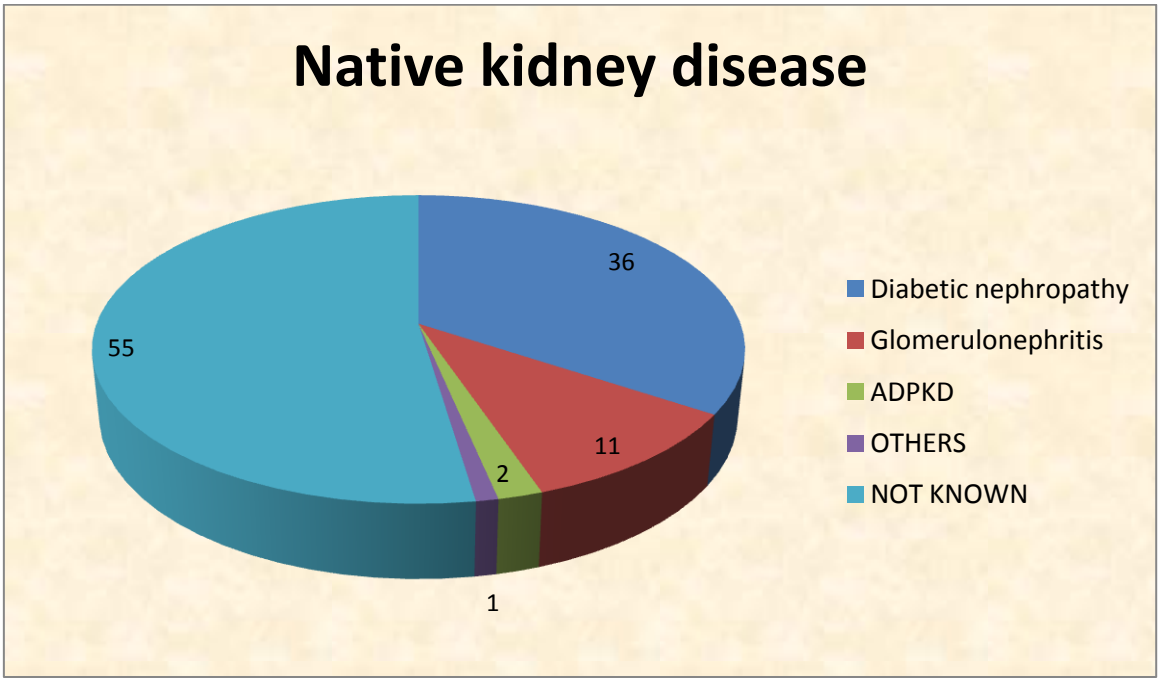


Baseline Characteristics

Table 10: Native kidney disease

NKD	Number of patients	%
DN	36	34.3
GN	11	10.5
ADPKD	2	1.8
OTHERS	1	0.9
NOT KNOWN	55	52.4
TOTAL	105	100.00

Figure - 10

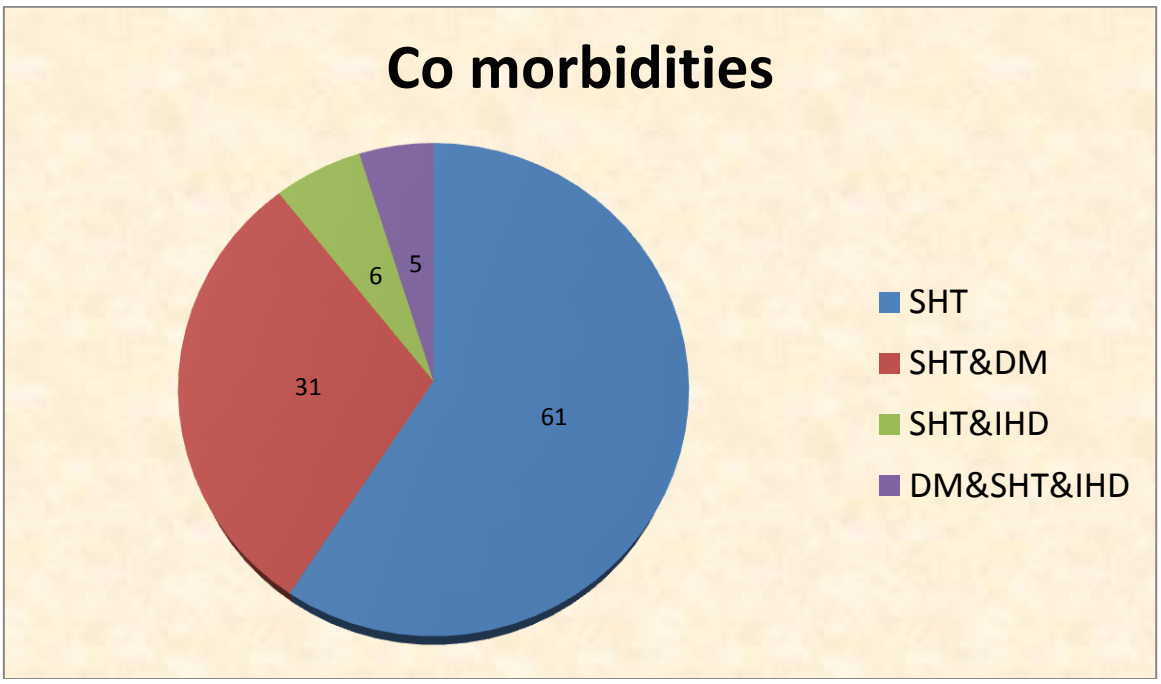


Baseline Characteristics

Table 11: Co morbidities

Co Morbidities	Number of patients (N=105)	%
SHT	61	58.1
SHT/DM	31	29.5
SHT/IHD	6	5.7
DM/SHT/IHD	5	4.8
TOTAL	105	100.00

Figure - 11



Baseline Characteristics

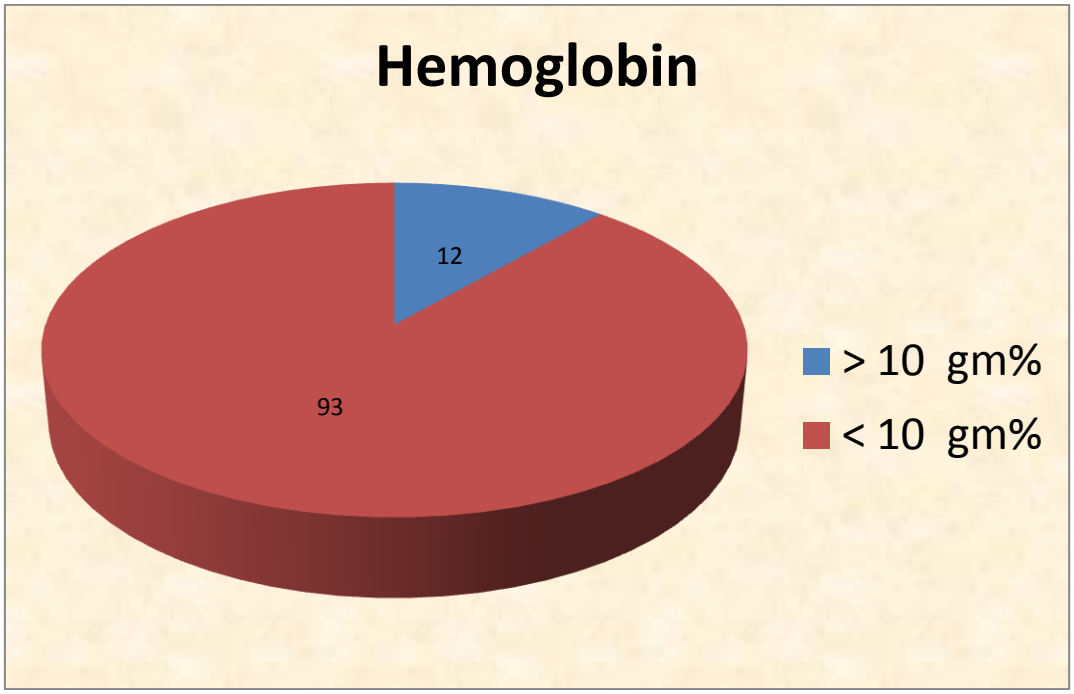
1. Baseline characteristics of 105 patients who responded to the WHO-QOL BREF questions no more than 30 days from completion of the questionnaire are shown in Tables-1 – 11 & Fig. 1-11
2. Among 105 patients on hemodialysis, there was a mixture of all ages seen in the study population.
3. Among the study population, 71(67%) were men 93(88%) were married.
4. Most of the patients in study population were unemployed 82(78.1%) and most of them 61(58%) were on twice weekly dialysis.
5. Most of the patients had their travel time to centre greater than 30 minutes (Table & Figure – 8)
6. Most of the patient's native kidney disease were undiagnosed (52.4%) followed by diabetic nephropathy (34.3%) (Table & Figure – 10)
7. More than 90% of the study population has hypertension as comorbidity and around 30% of the population has diabetes. (Table & Figure – 11)

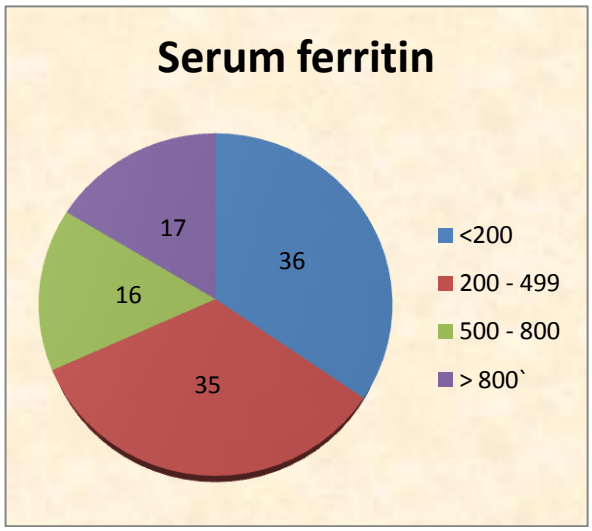
Table 12: Clinical characteristics of the study subjects

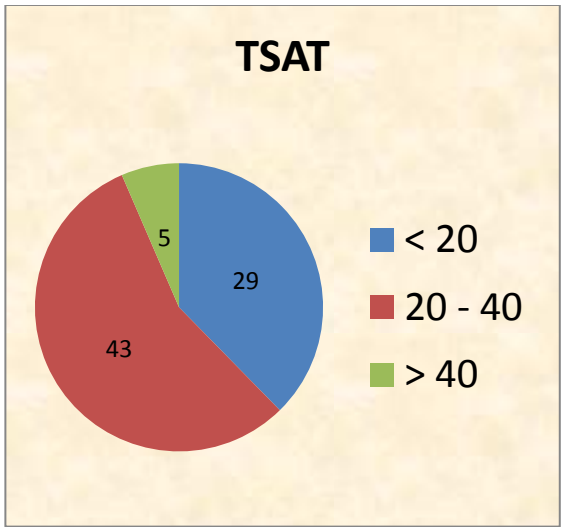
Variables	Number	Percentage
Hb		
<10	**93**	**88.57**
>10	**12**	**11.43**
Kt/v		
>1.2	**49**	**46.67**
<1.2	**56**	**53.33**
nPCR		
<1	**18**	**17.14**
>1	**87**	**82.86**
Albumin		
<3.5	**7**	**6.67**
>3.5	**98**	**93.33**
Serology		
B	**6**	**5.71**
C	**15**	**14.29**
N	**84**	**80.00**
Access		
C	**11**	**10.48**
F	**94**	**89.52**
Serum ferritin		
<200	**36**	**34.62**
200 – 499	**35**	**33.65**
500 – 800	**16**	**15.38**
>800	**17**	**16.35**
TSAT		
<20	**29**	**37.66**
20 – 40	**43**	**55.84**
>40	**5**	**6.49**

Clinical characteristics of the study subjects

Figure – 12 – Anemia status



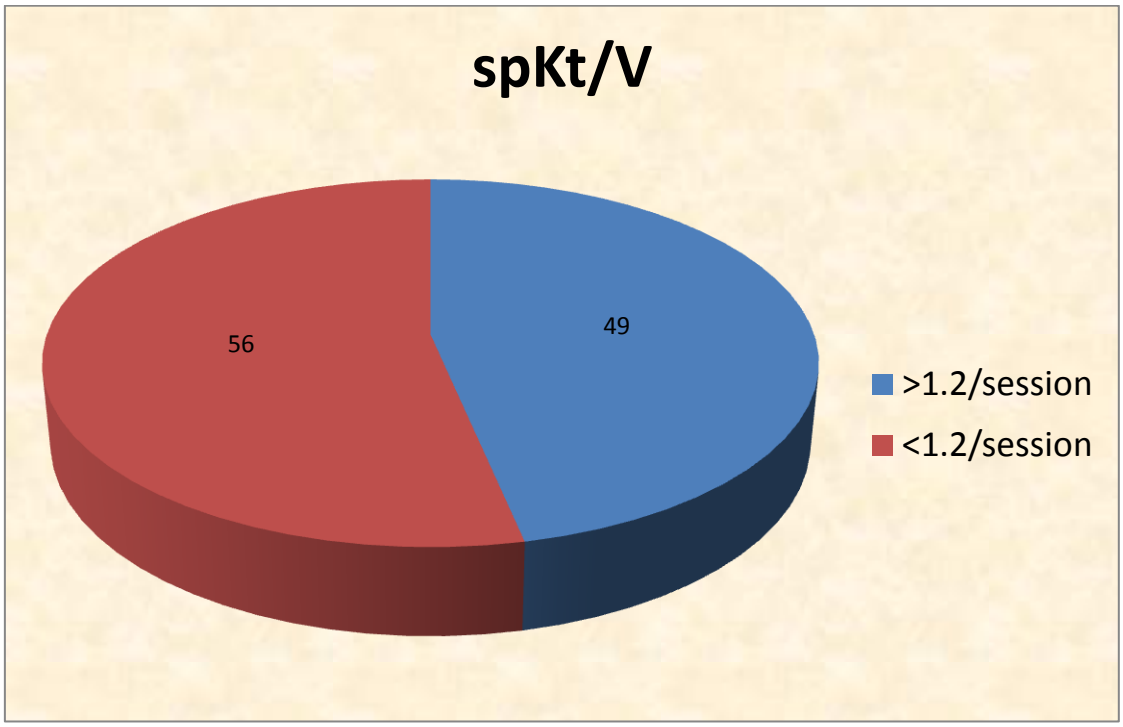




1. Around 88 % of the study population had anemia.
2. 35 % had iron deficiency reflected by low ferritin or transferrin saturation levels.

Clinical characteristics of the study subjects

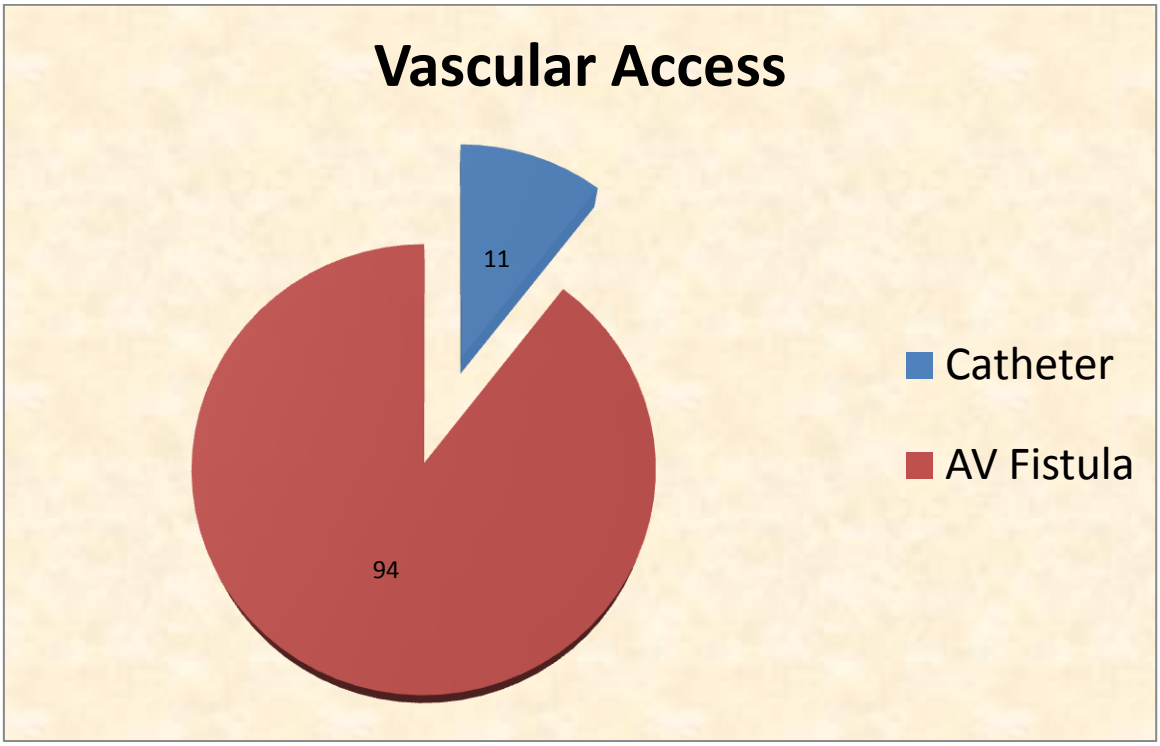
Figure – 13 – Dialysis adequacy



Around 50 % of the study population had adequate dialysis reflected by spKt/V of 1.2

Clinical characteristics of the study subjects

Figure – 14



There was a high prevalence rate native arteriovenous fistula as the vascular access in around 90 % of the study population.

Clinical characteristics of the study subjects

Nutritional status

Figure – 15

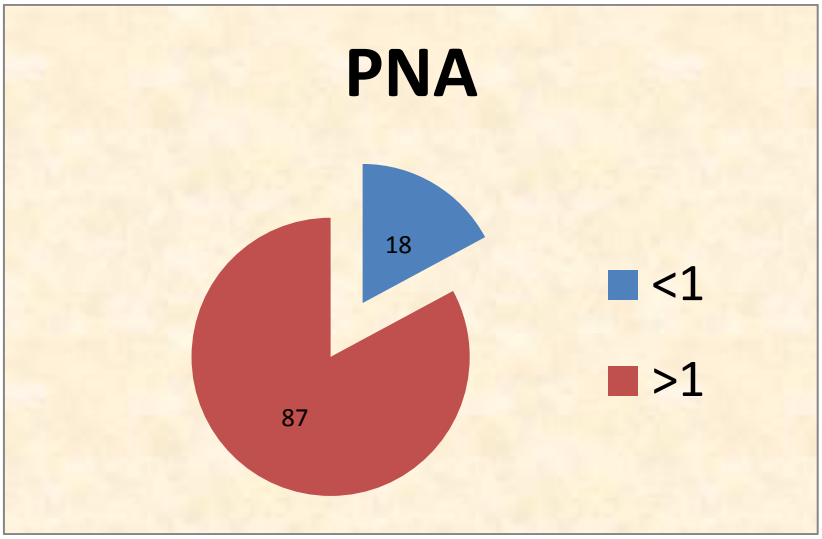
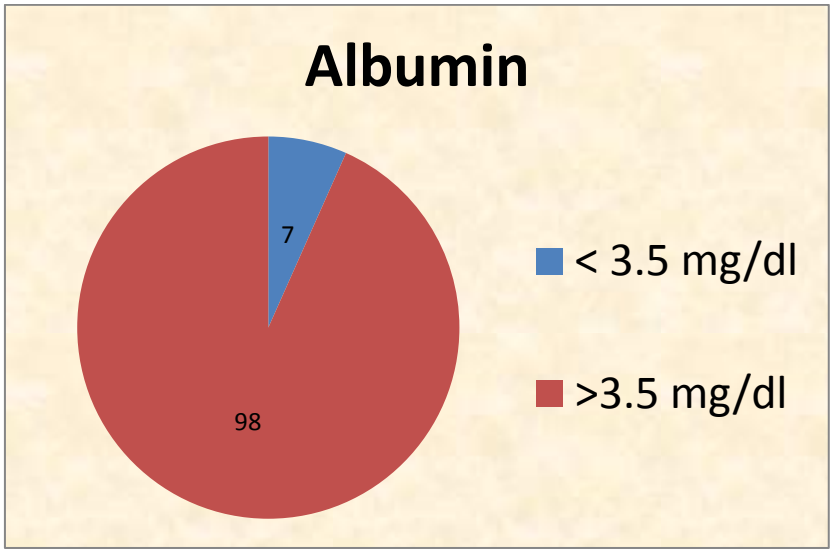


Figure – 16



1. Around 93% of the study population had albumin level greater than 3.5mg/dl
2. 80% of the population had PNA value greater than 1.

Clinical characteristics of the study subjects

Figure – 17

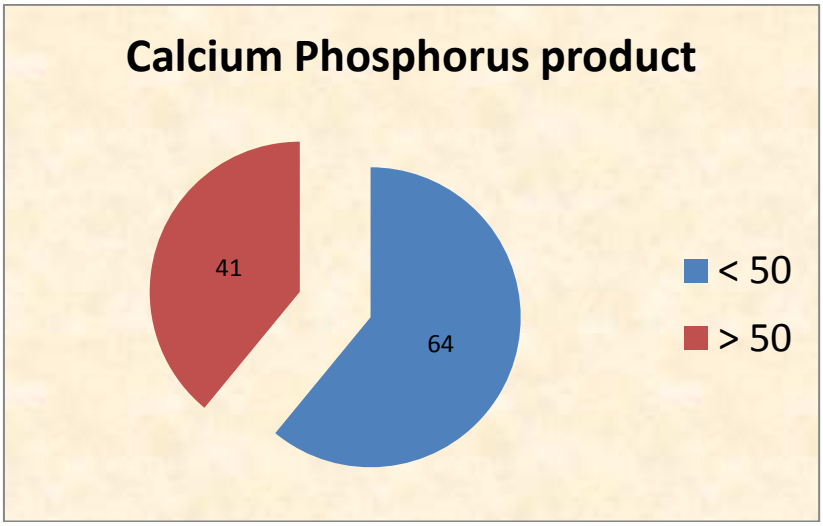
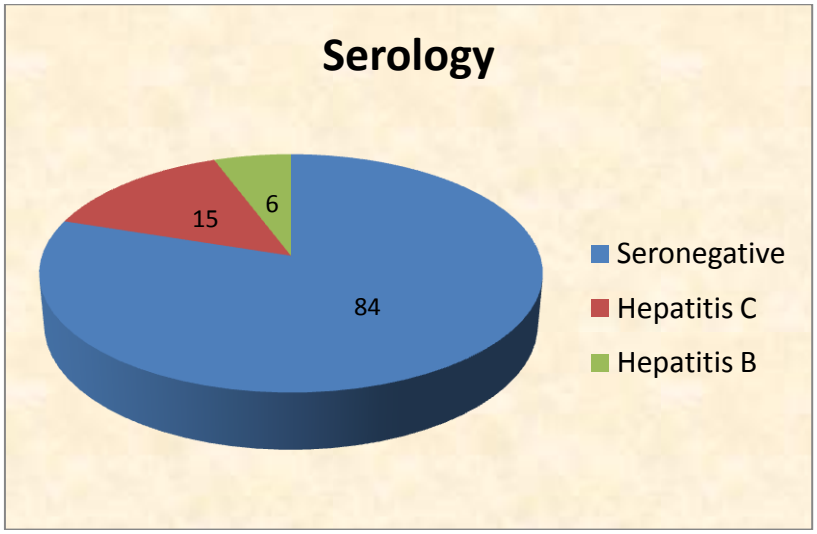


Figure – 18



1. Around 40% of the population had their calcium phosphorus product greater than 50.
2. 80 of the study population were seronegative, 14 % were seropositive for hepatitis C and 5 % were seropositive for hepatitis B

Clinical characteristics of the study subjects

Table – 13 – Mean values of the study variables expressed as mean ± standard deviation

Variables	Mean ± S.D
Hb in gm%	8.00 ± 1.72
Kt/v	1.22 ± 0.36
nPCR	1.51 ± 0.60
Albumin in mg/dl	4.06 ± 0.41
Ca-Pi product	46.15 ± 14.93
TSAT	24.00 ± 11.18
Calcium in mg/dl	8.54 ± 1.01
Phosphorous in mg/dl	5.44 ± 1.77
Creatinine in mg/dl	9.56 ± 2.84
Erythropoietin dose in IU per week	6052.63 ± 2438.00

Table 14: Comparison of Quality of life between demographic characteristics

Variable	Quality of Life				
	Domain1	**Domain2**	**Domain3**	**Domain4**	**Total QOL**
Gender					
Male	11.6 ± 2.1	11.4 ± 2.2	12.1 ±3.6	12.4 ± 2.4	47.5 ± 8.2
Female	11.5 ± 1.6	11.3 ± 2.0	12.7 ± 2.9	13.2 ± 2.0	48.6 ± 6.1
Marital					
Married	11.6 ± 2.0	11.4 ± 2.2	12.5 ± 3.4	12.6 ± 2.3	48.2 ± 7.8
Not-married	11.2 ± 1.5	11.0 ± 1.5	10.4 ± 2.8*	12.5 ± 2.3	45.1 ± 5.5
Employment					
Employee	12.1 ± 1.4	12.2 ± 1.7	13.0 ± 2.9	12.7 ± 1.8	49.9 ± 5.1
Not-employed	11.5 ± 2.1	11.2 ± 2.2*	12.1 ± 3.5	12.6 ± 2.4	47.3 ± 8.1
Education					
Illiterate	11.4 ± 1.3	11.8 ± 2.1	14.3 ± 2.6	12.3 ± 0.9	49.8 ± 3.4
Up to middle	11.7 ± 1.9	11.2 ± 1.9	12.1 ± 3.3	12.7 ± 2.1	47.8 ± 7.1
High school	11.6 ± 2.2	11.5 ± 2.1	12.2 ± 3.4	12.6 ± 2.3	47.9 ± 7.8
Graduates level	11.2 ± 1.7	11.1 ± 2.7	11.9 ± 2.8	12.6 ± 3.0*	46.9 ± 9.2
No per week					
2	11.6 ± 1.6	11.1 ± 1.6	12.5 ± 3.4	12.6 ± 2.1	47.9 ± 6.5
3	11.5 ± 2.3	11.7 ± 2.7	12.0 ± 3.3	12.7 ± 2.6	47.8 ± 8.9
Dialysis vintage					
< 6 months	12.3 ± 1.7	12.1 ± 1.7	13.9 ± 3.9	13.9 ± 2.1	52.2 ± 7.5
6-12 months	11.6 ± 1.8	11.3 ± 2.1	13.3 ± 3.2	12.3 ± 2.5	48.3 ± 7.1
13-24 months	11.9 ± 1.9	11.9 ± 2.1	12.3 ± 3.0	12.6 ± 2.5	48.8 ± 7.5
>24	11.2 ± 2.0	10.9 ± 2.2	11.4 ± 3.4	12.5 ± 2.3	46.0 ± 7.6
Time in hours					
<30 min	11.7 ± 1.6	11.7 ± 1.5	13.1 ± 2.9	12.7 ± 2.5	49.1 ± 6.1
30-60 min	11.6 ± 1.8	11.5 ± 2.3	11.9 ± 3.4	12.8 ± 2.6	47.7 ± 8.4
>60 min	11.5 ± 2.2	11.2 ± 2.1	12.4 ± 3.5	12.5 ± 2.0	47.6 ± 7.3
Income					
<1 lakh	11.4 ± 2.1	11.2 ± 2.3	12.1 ± 3.5	12.4 ± 2.3	47.1 ± 8.0
1 to 3 lakh	12.0 ± 1.6	11.4 ± 1.6	12.6 ±3.0	12.9 ± 2.3	48.9 ± 6.6
Above 3 lakh	10.5 ± 2.1	13.0 ± 0.1	14.5 ± 2.1	15.0 ± 2.8	53.0 ± 2.8

* -$p<0.05$; Independent t test to compare between the groups

Comparison of Quality of life and demographic characteristics

1. There was no gender difference in QOL scores and a low scores was noted in the social health domain in the unmarried population with a statistical significance. ($p < 0.05$).
2. Being Un-employed was significantly associated with lower QOL scores in psychological domain ($p < 0.05$).
3. QOL scores in patients with an educational qualification of graduates level was associated with better QOL scores particularly in environmental health domain ($p < 0.05$).
4. Interestingly, No difference was noted in between the groups on twice weekly and thrice weekly hemodialysis.
5. Patients with higher income experienced a better QOL. Scores in the social relationship domain was lower in the unmarried patients ($P < 0.05$).
6. Dialysis vintage & Time taken for travel to the dialysis unit had an inverse relation with the trend of QOL score but not statistically significant.
7. The group with higher income (above 3 lakh rupees) had a higher QOL scores compared with the lower income groups but did not reach statistical significance.
8. There was no difference in QOL between the twice weekly and thrice weekly group.

Table – 15 - Comparison of Quality of life and clinical characteristics

Variables	Quality of life				
	Domain 1	**Domain 2**	**Domain 3**	**Domain 4**	**Total**
Albumin					
<3.5	9.9 ± 2.9	9.4 ± 1.4	10.3 ± 1.6	11.6 ± 2.7	41.1 ± 6.1
≥3.5	11.7 ± 1.8	11.5 ± 2.1*	12.4 ± 3.4	12.7 ± 2.3	48.3 ± 7.5*
PNA cat					
<1	11.1 ± 1.3	10.9 ± 1.5	12.9 ± 2.7	12.7 ±2.1	47.6 ± 5.2
≥1	11.7 ± 2.0	11.4 ± 2.2	12.2 ± 3.5	12.6 ±2.3	47.9 ± 7.9
Access					
C	11.7 ± 1.7	11.6 ± 2.2	13.1 ± 2.9	12.5 ± 2.3	48.8 ± 7.7
F	11.6 ± 2.0	11.4 ± 2.1	12.2 ± 3.4	12.6 ± 2.3	47.7 ± 7.6
spKt/V					
<1.2	11.6 ± 2.1	11.2 ± 2.2	12.0 ± 3.2	12.4 ± 2.1	47.2 ± 7.0
≥1.2	11.6 ± 1.8	11.6 ± 2.1	12.5 ± 3.6	12.8 ± 2.5	48.5 ± 8.0
Co-Morbidity					
Only 1	11.8 ± 2.1	11.5 ± 2.2	12.4 ± 3.3	12.5 ± 2.2	48.2 ± 7.6
More than 1	11.2 ± 1.6	11.3 ± 2.1	12.0 ± 3.5	12.8 ± 2.5	47.3 ± 7.6
Nil	12.0 ± 1.4	10.5 ± 0.7	12.5 ± 4.9	13.5 ± 2.1	48.5 ± 9.2
NKD					
DN	11.2 ± 1.6	11.3 ± 2.1	11.8 ± 3.6	12.7 ± 2.6	47.0 ± 7.9
GN + others	11.4 ± 1.9	10.6 ± 1.4	13.1 ± 2.9	12.4 ± 2.1	47.4 ± 6.9
NK	11.9 ± 2.1	11.6 ± 2.3	12.4 ± 3.3	12.6 ± 2.2	48.5 ± 7.5
Serology					
Hepatitis B	10.8 ± 3.6	10.5 ± 2.1	11.0 ± 2.7	10.8 ± 1.9	43.2 ± 7.9
Hepatitis C	12.2 ± 1.7	11.5 ± 1.6	11.6 ± 2.7	12.7 ± 2.0	48.1 ± 6.1
Seronegative	11.5 ± 1.8	11.4 ± 2.2	12.5 ± 3.5	12.7 ± 2.3	48.1 ± 7.8

* -p<0.05; Independent t test or ANOVA to compare between the groups

Table – 15 (contd.,)- Comparison of Quality of life and clinical characteristics

Variables	Quality of life				
	Domain 1	**Domain 2**	**Domain 3**	**Domain 4**	**Total**
Hb					
≤ 10	11.5 ± 1.9	11.3 ± 2.0	12.2 ± 3.4	12.5 ± 2.3	47.5 ± 7.4
Above 10	12.4 ± 1.9	12.2 ± 2.7	12.5 ± 3.4	13.2 ± 2.4	50.3 ± 8.9
Ferritin					
< 200	11.5 ± 2.3	11.8 ± 2.3	13.2 ± 3.1	13.0 ± 2.7	49.5 ± 8.2
200 – 499	11.6 ± 1.7	11.1 ± 1.7	12.1 ± 3.6	12.2 ± 2.0	47.0 ± 7.1
500 – 800	10.9 ± 2.2	11.1 ± 3.0	11.7 ± 3.8	13.1 ± 2.3	46.7 ± 8.8
>800	12.2 ± 1.3	11.3 ± 1.7	11.4 ± 2.8	12.5 ± 2.0	47.5 ± 6.0
TSAT					
<20	11.6 ± 1.6	11.9 ± 2.0	13.1 ± 3.1	12.8 ± 2.4	49.4 ± 7.2
20 and above	11.6 ± 2.0	11.2 ± 2.4	12.2 ± 3.8	12.7 ± 2.3	47.7 ± 8.1
Calcium					
<8	11.7 ± 2.7	12.0 ± 2.7	12.5 ± 3.8	13.2 ± 2.4	49.5 ± 9.6
8 – 10	11.5 ± 1.7	11.1 ± 2.0	12.2 ± 3.3	12.4 ± 2.3	47.3 ± 7.2
> 10	11.8 ± 1.8	12.6 ± 0.5	11.8 ± 2.9	12.6 ± 0.5	48.8 ± 1.3
Phosphorous					
≤ 5.5	11.3 ± 1.9	11.0 ± 2.0	12.0 ± 3.2	12.5 ± 2.2	46.8 ± 7.0
> 5.5	11.9 ± 2.0	11.7 ± 2.2	12.5 ± 3.6	12.7 ± 2.4	48.9 ± 8.1
CaxP					
<50	11.4 ± 1.9	11.1 ± 2.1	12.1 ± 3.3	12.6 ± 2.3	47.3 ± 7.4
≥50	11.8 ± 2.0	11.7 ± 2.2	12.5 ± 3.6	12.7 ± 2.3	48.7 ± 7.9

* -p<0.05; Independent t test or ANOVA to compare between the groups

Comparison of Quality of life and clinical characteristics

1. Patients with serum albumin level greater than 3.5mg/dl had a better QOL scores in the psychological health domain and total QOL score (p<0.05).

2. No difference was noted between the groups of patients with higher or lower kt/v, PNA.

3. Patients with more co-morbidity had lower scores; patients with native kidney disease of diabetic nephropathy had lower QOL score but neither reached statistical significance.

4. Seronegative & Hepatitis C patients had comparable QOL scores but patients with hepatitis B patients had lower QOL scores but not statistically significant.

5. Patients with Hb greater than 10gm% had better QOL scores but not statistically significant.

6. There was no difference in QOL scores in the groups with different ferritin levels and TSAT levels.

7. There was no difference in QOL scores in the groups with different levels of calcium, phosphorus or calcium-phosphorus product.

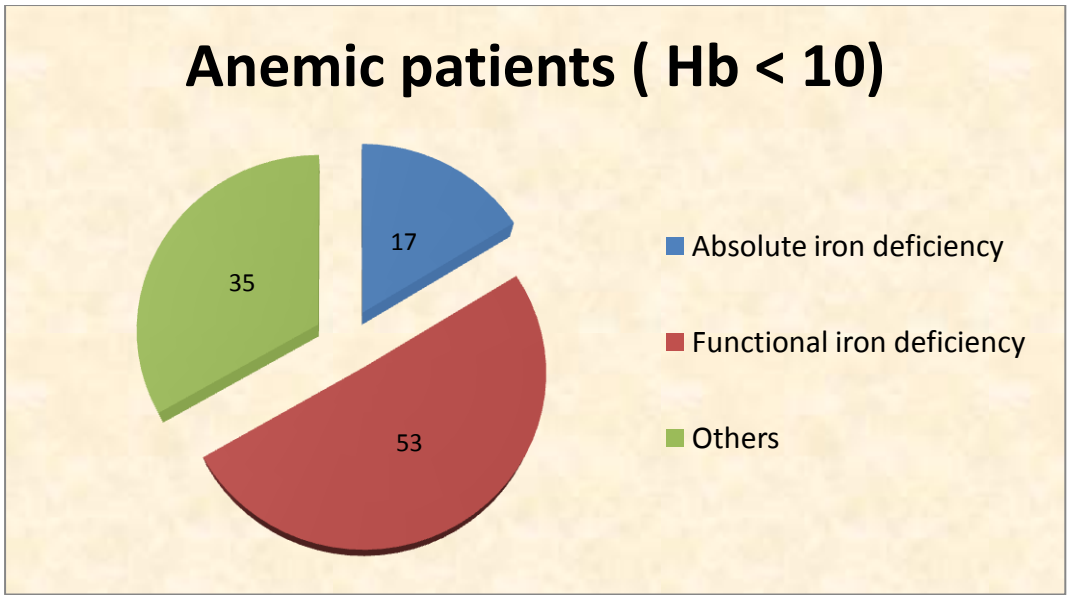
SUBGROUP ANALYSIS OF ANEMIC PATIENTS

Iron Status Evaluation

Table - 16

Iron status	Number of patients (Hb <10)	%
Absolute iron deficiency	17	18.2
Functional iron deficiency	53	56
Remaining	23	24
Total	93	100.0

Figure - 19



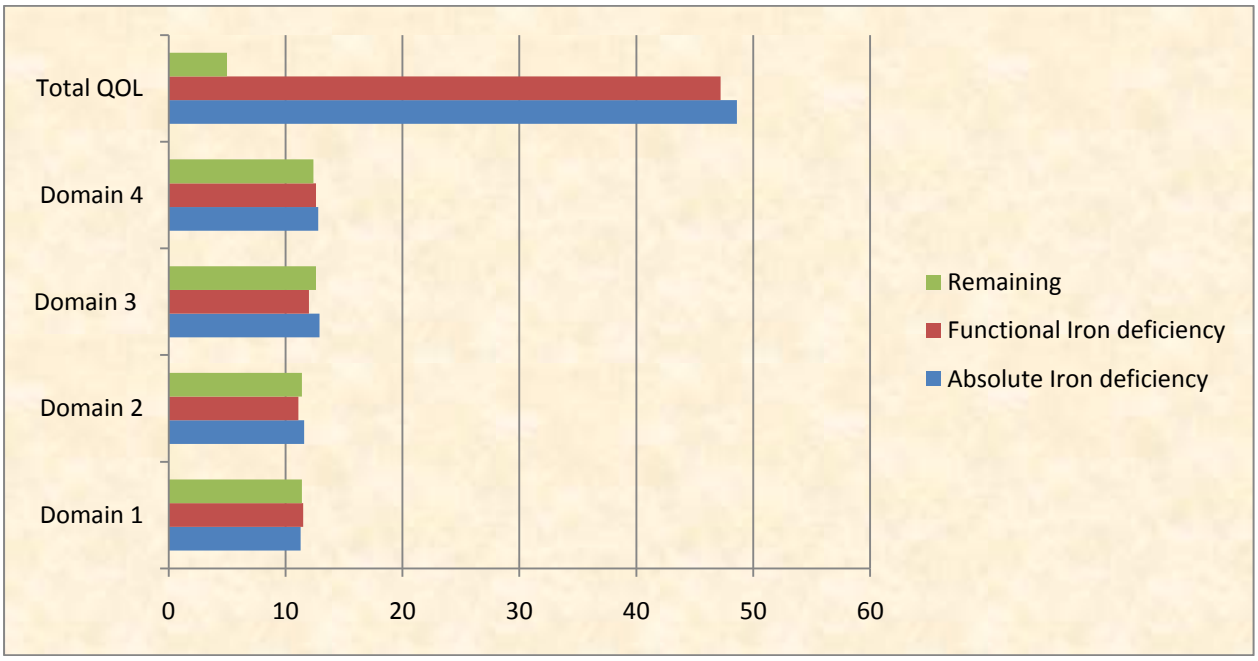
1. Overall prevalence of anemia was 88% (93/105).
2. Of those with anemia, 56% of patients had functional iron deficiency and only 18% had absolute iron deficiency.

QUALITY OF LIFE IN ANEMIA SUB-GROUP

Table - 17

Variable	Quality of life				
	Domain 1	**Domain 2**	**Domain 3**	**Domain 4**	**Total QOL**
Absolute Iron deficiency	11.3 ± 1.7	11.6 ± 2.1	12.9 ± 3.1	12.8 ± 3.0	48.6 ± 7.8
Functional Iron deficiency	11.5 ± 1.9	11.1 ± 2.2	12.0 ± 3.8	12.6 ± 2.1	47.2 ± 7.8
Remaining	11.4 ± 2.0	11.4 ± 2.0	12.5 ± 3.0	12.4 ± 2.5	47.8 ± 7.0

Figure - 20



There was no difference in QOL scores noted in any of the domain with different groups based on the iron status.

Erythropoietin usage in anemic group and subgroups

Figure – 21

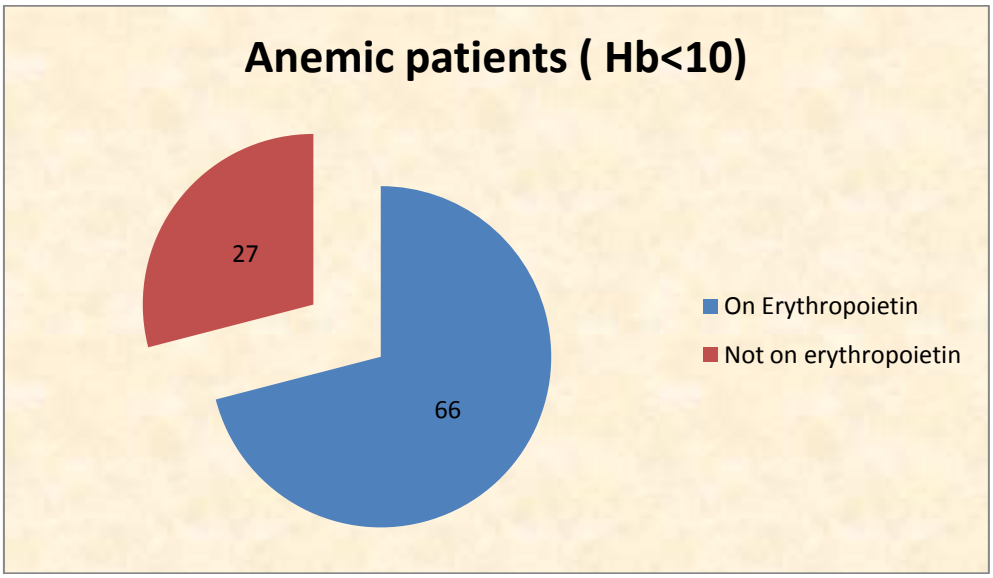
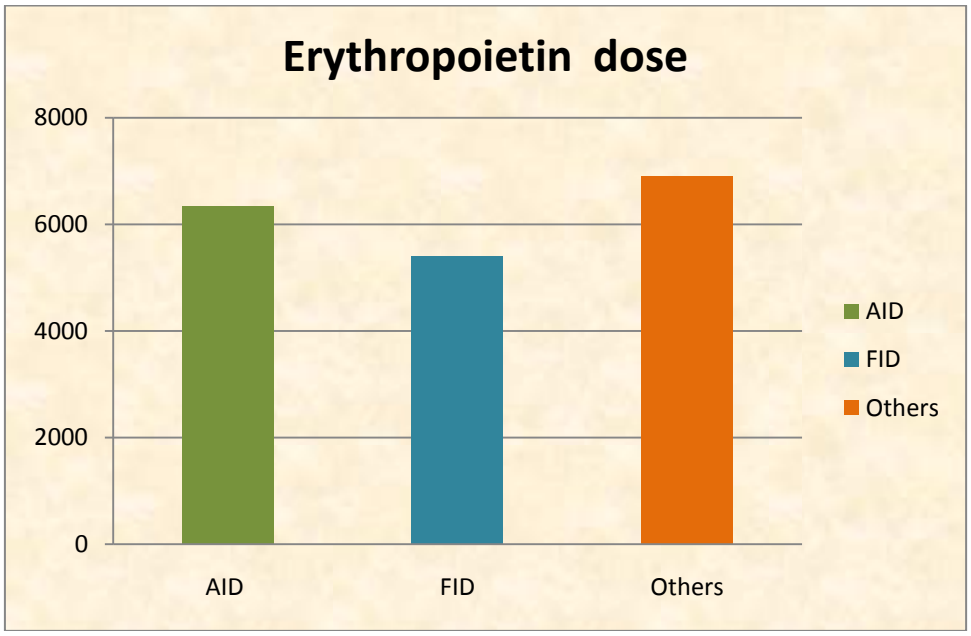


Figure - 22



QUALITY OF LIFE IN GROUPS BASED ON EYTHROPOIETIN USAGE

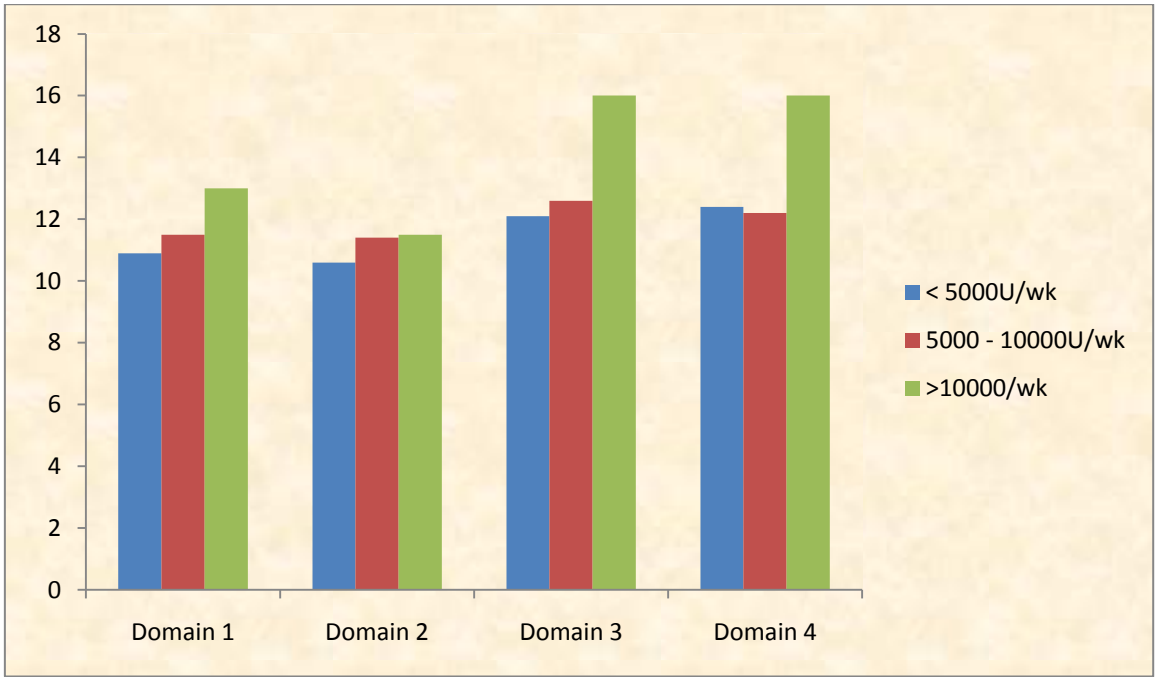
Table - 18

Variable	Quality of life				
	Domain 1	**Domain 2**	**Domain 3**	**Domain 4**	**Total QOL**
Erythropoietin usage					
Not used	11.3 ± 1.9	11.1 ± 2.0	12.5 ± 3.4	12.4 ± 2.4	47.2 ± 7.7
used	12.0 ± 1.8	11.8 ± 2.0	11.7 ± 3.4	12.9 ± 1.9	48.4 ± 6.6
Erythropoietin dose					
<5000	10.9 ± 2.1	10.6 ± 2.2	12.1 ± 3.5	12.4 ± 2.0	46.0 ± 7.8
5000 – 10000	11.5 ± 1.8	11.4 ± 1.9	12.6 ± 3.2	12.2 ± 2.7	47.7 ± 7.5
>10000	13.0 ± 2.8	11.5 ± 0.7	16.0 ± 0.0	16.0 ± 1.4	56.5 ± 3.5

* -p<0.05; Independent t test or ANOVA to compare between the groups

QOL SCORES BASED ON ERYTHROPOIETIN DOSE RECIEVED

Figure - 23



1. There was no difference noted in between the used group and not used group in QOL scores. (Table - 18)

2. There was an increasing trend in QOL scores noted in patients with higher doses of EPO (Figure - 23)

Table 19:
Pearson Correlation test between the Quality of life and the variables:

Variables	Quality of life				
	Domain 1	**Domain 2**	**Domain 3**	**Domain 4**	**Total QOL**
Age	-0.2229*	-0.1424	-0.1550	0.0354	-0.1550
Duration in months	-0.0479	-0.0876	-0.1603	-0.0133	-0.1108
No./week	-0.0297	0.1287	-0.0720	0.0149	-0.0018
Erythropoietin dose (N/ dose/wk)	0.2446*	0.2090	0.2055	0.1157	0.3195*
Kt/v	0.0352	-0.0749	-0.0845	-0.0579	-0.0658
nPCR	-0.0662	0.0555	-0.0219	-0.0233	-0.0205
Hb	0.0865	0.1614	0.0194	0.0922	0.1077
Calcium mg	-0.0729	-0.1093	-0.0272	-0.0786	-0.0878
Phosphorus mg	0.0755	0.1774	0.0581	0.1182	0.1328
Ca XP	0.0417	0.1103	0.0429	0.0801	0.0860
Creatinine	0.1719	0.1261	-0.0479	0.0548	0.0756
Albumin	0.2888**	0.1768	-0.0304	-0.0138	0.1074
Calcium alb	-0.1639	-0.1641	-0.0171	-0.0730	-0.1208

* - p <0.05; ** - p < 0.01; Pearson or Spearman's Rank correlation as appropriate

Pearsons or Spearman's Rank correlation between the QOL and variables

1. There was a significant negative correlation in physical health domain for age. ($p < 0.05$)
2. There was a significant positive correlation in physical health domain for albumin. ($p < 0.01$)
3. There was a significant positive correlation in physical health domain and Total QOL for Erythropoietin dose (N/ dose/wk).
4. There was positive correlation noted in all domains with higher hemoglobin levels and higher phosphorus levels but the correlation did not reached statistical significance.
5. There was a negative correlation noted with longer dialysis vintage and higher calcium levels but not statistically significant.

DISCUSSION

Patients with End-stage renal disease (ESRD) on maintenance hemodialysis has lower quality of life in comparison to the general population.[18, 47and 54] The scores observed in our study were comparable to the scores noted in a similar population.[18] The problems with low QOL are its independent association with poor outcome[7] and a risk of withdrawal of treatment.[41] The various reasons for low QOL scores in patients on MHD are high incidence of depression, [41, 56] secondary to their socio-economic factors, co-morbidities and complications secondary to ESRD, of which some factors are potentially modifiable and treatable.

Correlation with demographic characteristics

In the present study, the sample of patients was a mix of patients representing all age groups except pediatric age group. The baseline characteristics are comparable to other studies conducted in the same field in the past.[3,18]

Of the demographic factors, higher age has a negative correlation with the QOL in all domains but has statistical significance only in the physical health domain ($p< 0.05$). The same finding was observed in other studies.[3,18] The possible explanation for this might be the fact that as the age increases, the complications of chronic kidney disease that affects multiple organ systems of the body increases leading to decreased functional capability of the patients.

There was mild over-representation of male gender in the sample which was comparable to other studies but there was no differences noted in QOL scores. However in a study conducted by Sathvik et al,[18] lower scores were observed in female patients.

Higher QOL scores were observed in employed patients and patients with higher annual income in all 4 domains and reaches statistical significance in the psychological health domain. The findings of our study are consistent those of the other studies.[17, 18] The probable reasons for this might be financial independence, better mobility and lesser restriction of daily activities. But around 80% of the patients in our study were unemployed. So employment has been found to be an important factor improving the QOL in ESRD patients.[55] Higher income increases the ability of the patient to afford the necessary treatment and increases compliance with the prescribed medicines.

There was no significant differences in QOL between the groups divided based on educational and marital status. We expect a better QOL scores in the patients on thrice weekly hemodialysis. Interestingly we noticed comparable QOL scores in patients on twice weekly and thrice weekly hemodialysis. The possible reason for this observation is selection of patients for thrice weekly sessions. Though we advice the patients for thrice weekly schedule, patients usually prefer twice weekly schedule unless they are overtly symptomatic (volume

overload). So patient selection for thrice weekly schedules might be the contributing factor for non-superiority of QOL in thrice weekly patients.

Patients who were on dialysis for a longer period (dialysis vintage) responded with lower QOL scores and there was a negative correlation noted in all 4 domains. Similar observations were made in the past studies.[41] The possible reasons for this observation might be the association of longer vintage with unfavorable changes in nutritional status like body weight and composition, higher risk of access failures and cardiovascular morbidity. In a study conducted by chertow et al, even a year longer the dialysis vintage was shown to be associated with 6% increase in the risk of death.[20] However in a study conducted by veerappan et al, longer dialysis vintage was shown to be a positive predictor of QOL.[3]

We observed lower QOL scores in the patient group with longer travel time when compared with shorter travel time. In an international study conducted by moist et al, longer travel time was shown to be significantly associated with decreased QOL and greater mortality.[42] The reason might be the financial expenses faced by the patient associated with longer travel time. So the patients with travel time longer than 60 minutes have to be identified and measures to decrease the travel time should be undertaken. This problem could be overcome only by encouraging alternative renal replacement therapy in the form of

peritoneal dialysis in eligible patients and the development of standalone satellite dialysis centres as it is there in the western world.[42]

Correlation with clinical characteristics

Higher albumin levels were associated with better quality of life as reflected by better QOL scores in all 4 domains that are significant in psychological health domain ($p < 0.05$) and also showed a significant positive correlation by Pearson correlation test in the physical health domain ($p < 0.01$). Similar observations were made in many previous studies.[3, 17, 18]. The mean estimated protein intake in our patients is 1.54 ± 0.60 as calculated by PNA and the mean albumin level in our patients was 4.06± 0.41. There are various markers of malnutrition in CKD population, but as of the present date serum albumin level is the marker that was widely studied and considered to be a useful marker of malnutrition. This underscores the importance of correction of albumin to prevent malnutrition and increase the QOL. So hypoalbuminemia (serum albumin < 3.5 gm/dl) can be considered as a marker of malnutrition and measures to prevent and treat the condition by good dietary counseling of the patients might improve their QOL.

Our study shows that there was a high prevalence of anemia in our setting. The main reason for such high prevalence of anemia is the financial constraints of the patients making them unaffordable to the cost of erythropoietin. Patients with higher hemoglobin levels had better QOL and there was positive

correlation of hemoglobin with the QOL but this correlation did not reach statistical significance. Similar observations were made in the past.[3, 17, 18] There was a high prevalence of functional iron deficiency in our population. In the subgroup analysis of patients divided based on their iron status (absolute iron deficiency and functional iron deficiency) and erythropoietin use, there was no difference in QOL scores noted between the groups.

Patients who were treated with EPO had comparable scores with patients who were not on EPO. But of those patients who received erythropoietin, there was a statistically significant positive correlation between the higher doses of EPO and better QOL in the physical health domain and total QOL ($p < 0.05$). The correlation persisted even after adjusting for their hemoglobin levels. So the beneficial effect of EPO does not solely depend on the increment in hemoglobin levels of the patient. In a study conducted by Canadian erythropoietin study group, it was shown that the patients treated with EPO were less fatigued, and had better exercise tolerance compared with the placebo, but the benefit was concluded to be secondary to increment in hemoglobin levels.[19] In a study conducted by Beusterien et al, it was concluded that in addition to improvement in hematocrit levels other unidentified factors also contributes for the better QOL outcomes.[59]

We noticed a high prevalence rate of native arteriovenous fistula in around 90% of the population. However, we have not found any significant differences in

the groups pertaining to the access. But studies in the past had shown that patients with catheter as access had lower QOL.[3,17,37] The reason for absence of such finding in our study might be the very small number of patients with current catheter use.

We were able to achieve a spKt/V of greater than 1.2 in only 50% of the patients but there was no difference in QOL between the groups with greater or lesser spKt/V. Some observational studies in the past have shown an association between higher Kt/V with lower risk of mortality. However in a landmark trial of Dialysis Outcomes and Practice Patterns Study (DOPPS) there was no benefit in QOL and in fact a lower QOL was seen with higher dialysis dose.[17]

Patients with chronic hepatitis B had lower QOL in comparison with chronic hepatitis C and seronegative patients but the difference was not significant. In a study conducted by Ong et al in general population, patients with chronic hepatitis B infection had poorer QOL compared with the placebo particularly when they experience disease progression. Patients on MHD with chronic hepatitis C have been shown to have lower QOL in a study by Afsar et al.[44] So measures to prevent seroconversion has to be undertaken to prevent deterioration of the QOL in patients on MHD.

No other significant association or correlation were noted in relation to the patient related factors like co-morbidities, native kidney disease, calcium levels, phosphorus level, and calcium-phosphorus product.

SUMMARY AND CONCLUSION

One hundred and five patients on maintenance hemodialysis in our centre were cross-sectionally included in the study. The Quality of life of patients was assessed with WHOQOL BREF scale. The same was correlated with demographic and clinical variables of the patients.

Observations made out of the study

By independent t test or ANOVA, unemployment status, lower economic status, longer dialysis vintage and longer travel time to the dialysis centre were the demographic factors associated with poorer QOL and lower albumin and hemoglobin levels were the clinical factors associated with poorer QOL.

There was no difference in QOL based on the analysis done with iron status of the patient. But higher doses of erythropoietin were associated with better QOL in these patients.

By pearson or spearman's rank correlation test, higher age was negatively correlated with QOL and higher albumin level, higher hemoglobin levels and higher doses of erythropoietin use were positively correlated with QOL scores.

Limitations of the study

As the present study was a cross sectional study, drawing cause and effect conclusion between the factors and QOL is not possible. The other limitation of the present study is small sample size and the study was conducted in a single centre – so the result obtained in the present study may not be generalizable to other patient population. Most of the patients in our study were on twice weekly dialysis schedule. Dialysis inadequacy might be a confounding factor for low QOL observed. This also makes it difficult to compare with other studies with patients on thrice weekly schedule. The other important confounding factor is the fact that the study was carried out in the same centre where the authors worked and this might led on to biased scoring of the questionnaire. Since the questionnaire was a self administered one, fluctuations in the patient's attention, motivation, comprehension might have influenced the scores – leading on to measurement error.[60]

Conclusion

Our results show that higher age and unemployment of the demographic factors and hypoalbuminemia of the clinical factors were the significant negative determinants of QOL. Higher doses of erythropoietin were the significant positive determinant of QOL. The results of this study suggest that the QOL in patients on MHD is considerably influenced by the factors like demographic parameters, clinical and laboratory parameters of the patient. Of these parameters, many parameters are modifiable and the steps to prevent or treat such factors might improve the QOL in the patients.

BIBLIOGRAPHY

1. Modi GK, Jha V. The incidence of end-stage renal disease in India: a population-based study. Kidney Int.2006; 70:2131-3.
2. Pakpour AH, Saffari M, Yekaninejad MS, Panahi D, Harrison AP, Molsted S. Health-related quality of life in a sample of Iranian patients on hemodialysis. Iran J Kidney Dis. 2010 Jan;4(1):50-9.
3. Veerappan I, Arvind RM, Ilayabharthi V. Predictors of quality of life of hemodialysis patients in India. Indian J Nephrol. 2012 Jan;22(1):18-25. doi: 10.4103/0971-4065.91185.
4. National Kidney Foundation. KDOQI Clinical Practice Guidelines and Clinical Practice Recommendations for 2006 Updates: Hemodialysis Adequacy, Peritoneal Dialysis Adequacy and Vascular Access. Am J Kidney Dis 48:S1-S322, 2006 (supplement1)
5. KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. Kidney International Supplements (2013) 3.
6. Amira O. Prevalence of symptoms of depression among patients with chronic kidney disease. Niger J Clin Pract. 2011 Oct-Dec;14(4):460-3. doi: 10.4103/1119-3077.91756.
7. Østhus TB, Preljevic VT, Sandvik L, Leivestad T, Nordhus IH, Dammen T, Os I. Mortality and health-related quality of life in prevalent dialysis

patients: Comparison between 12-items and 36-items short-form health survey. Health Qual Life Outcomes. 2012 May 6;10:46. doi: 10.1186/1477-7525-10-46.

8. Jeloka TK, Upase S, Chitikeshi S. Monthly cost of three exchanges a day peritoneal dialysis is same as of thrice a week hemodialysis in self-paying Indian patients. Indian J Nephrol. 2012 Jan;22(1):39-41. doi: 10.4103/0971-4065.83739.
9. Levin A, Thompson CR, Ethier J, Carlisle EJ, Tobe S, Mendelssohn D, Burgess E, Jindal K, Barrett B, Singer J, Djurdjev O. Left ventricular mass index increase in early renal disease: impact of decline in hemoglobin. Am J Kidney Dis. 1999 Jul;34(1):125-34.
10. Jurkovitz CT, Abramson JL, Vaccarino LV, Weintraub WS, McClellan WM. Association of high serum creatinine and anemia increases the risk of coronary events: results from the prospective community-based atherosclerosis risk in communities (ARIC) study. J Am Soc Nephrol. 2003 Nov;14(11):2919-25.
11. Abramson JL, Jurkovitz CT, Vaccarino V, Weintraub WS, McClellan W. Chronic kidney disease, anemia, and incident stroke in a middle-aged, community-based population: the ARIC Study. Kidney Int. 2003 Aug;64(2):610-5.
12. Sarnak MJ, Tighiouart H, Manjunath G, MacLeod B, Griffith J, Salem D, Levey AS. Anemia as a risk factor for cardiovascular disease in The

Atherosclerosis Risk in Communities (ARIC) study. J Am Coll Cardiol. 2002 Jul 3;40(1):27-33.

13. McClellan WM, Flanders WD, Langston RD, Jurkovitz C, Presley R. Anemia and renal insufficiency are independent risk factors for death among patients with congestive heart failure admitted to community hospitals: a population-based study. J Am Soc Nephrol. 2002 Jul;13(7):1928-36.

14. National Kidney Foundation. KDOQI Clinical Practice Guidelines and Clinical Practice Recommendations for Anemia in Chronic Kidney Disease. Am J Kidney Dis 47:S1-S146, 2006 (suppl 3).

15. Fernández-Rodríguez AM, Guindeo-Casasús MC, Molero-Labarta T, Domínguez-Cabrera C, Hortal-Casc n L, Pérez-Borges P, Vega-Díaz N, Saavedra-Santana P, Palop-Cubillo L. Diagnosis of iron deficiency in chronic renal failure. Am J Kidney Dis. 1999 Sep;34(3):508-13.

16. Rambod M, Kovesdy CP, Kalantar-Zadeh K. Combined high serum ferritin and low iron saturation in hemodialysis patients: the role of inflammation. Clin J Am Soc Nephrol. 2008 Nov;3(6):1691-701. doi: 10.2215/CJN.01070308.

17. Lopes AA, Bragg-Gresham JL, Goodkin DA, Fukuhara S, Mapes DL, Young EW, Gillespie BW, Akizawa T, Greenwood RN, Andreucci VE, Akiba T, Held PJ, Port FK. Factors associated with health-related quality of

life among hemodialysis patients in the DOPPS. Qual Life Res. 2007 May;16(4):545-57.

18. Sathvik BS, Parthasarathi G, Narahari MG, Gurudev KC. An assessment of the quality of life in hemodialysis patients using the WHOQOL-BREF questionnaire. Indian J Nephrol. 2008 Oct;18(4):141-9. doi: 10.4103/0971-4065.45288.

19. Association between recombinant human erythropoietin and quality of life and exercise capacity of patients receiving haemodialysis. Canadian Erythropoietin Study Group.BMJ. 1990 Mar 3;300(6724):573-8.

20. Chertow GM, Johansen KL, Lew N, Lazarus JM, Lowrie EG. Vintage, nutritional status, and survival in hemodialysis patients. Kidney Int. 2000 Mar;57(3):1176-81.

21. Centers for Medicare and Medicaid Services, Kinney R. 2005 Annual Report: ESRD Clinical Performance Measures Project. Am J Kidney Dis. 2006 Oct;48(4 Suppl 2):S1-106.

22. Bossola M, Muscaritoli M, Tazza L, Giungi S, Tortorelli A, Rossi Fanelli F, Luciani G. Malnutrition in hemodialysis patients: what therapy? Am J Kidney Dis. 2005 Sep;46(3):371-86.

23. Ikizler TA, Flakoll PJ, Parker RA, Hakim RM. Amino acid and albumin losses during hemodialysis. Kidney Int. 1994 Sep;46(3):830-7.

24. Riella MC. Malnutrition in dialysis: malnourishment or uremic inflammatory response? Kidney Int. 2000 Mar;57(3):1211-32.

25. Mitch WE, Maroni BJ. Factors causing malnutrition in patients with chronic uremia. Am J Kidney Dis 1999; 33:176-9.

26. Chazot C, Laurent G, Charra B, Blanc C, VoVan C, Jean G, Vanel T, Terrat JC, Ruffet M. Malnutrition in long-term haemodialysis survivors. Nephrol Dial Transplant. 2001 Jan;16(1):61-9.

27. Sherman RA, Cody RP, Rogers ME, Solanchick JC. Interdialytic weight gain and nutritional parameters in chronic hemodialysis patients. Am J Kidney Dis. 1995 Apr;25(4):579-83.

28. Pickering WP, Price SR, Bircher G, Marinovic AC, Mitch WE, Walls J. Nutrition in CAPD: serum bicarbonate and the ubiquitin-proteasome system in muscle. Kidney Int. 2002 Apr;61(4):1286-92.

29. Qureshi AR, Alvestrand A, Divino-Filho JC, Gutierrez A, Heimbürger O, Lindholm B, Bergström J. Inflammation, malnutrition, and cardiac disease as predictors of mortality in hemodialysis patients.J Am Soc Nephrol. 2002 Jan;13 Suppl 1:S28-36.

30. Martin K. Kuhlmann,, Andreas Kribben, Michael Wittwer, and Walter H. Hörl. OPTA—malnutrition in chronic renal failure Nephrol. Dial. Transplant. (2007) 22(suppl 3): iii13-iii19 doi:10.1093/ndt/gfm016

31. Kalantar-Zadeh K, Supasyndh O, Lehn RS, McAllister CJ, Kopple JD. Normalized protein nitrogen appearance is correlated with hospitalization and mortality in hemodialysis patients with Kt/V greater than 1.20. J Ren Nutr. 2003 Jan;13(1):15-25.

32. Laird NM, Berkey CS, Lowrie EG. Modeling success or failure of dialysis therapy: the National Cooperative Dialysis Study. Kidney Int Suppl. 1983 Apr;(13):S101-6.

33. Jindal, KK, Goldstein, MB. Urea kinetic modeling in chronic hemodialysis: Benefits, problems, and practical solutions. Semin Dial 1988; 1:82.

34. Tattersall J, Martin-Malo A, Pedrini L, Basci A, Canaud B, Fouque D, Haage P, Konner K, Kooman J, Pizzarelli F, Tordoir J, Vennegoor M, Wanner C, ter Wee P, Vanholder R. EBPG guideline on dialysis strategies. Nephrol Dial Transplant. 2007 May;22 Suppl 2:ii5-21.

35. Dialysis Outcomes Quality Initiative Guidelines. Clinical practice guidelines for nutrition in chronic renal failure. Guideline 15. Am J Kidney Dis 2000. Am J Kidney Dis 2000; 35(Suppl 2):S40.

36. Harter HR. Review of significant findings from the National Cooperative Dialysis Study and recommendations. Kidney Int Suppl. 1983 Apr;(13):S107-12.

37. Lacson E Jr, Xu J, Lin SF, Dean SG, Lazarus JM, Hakim R. Association between achievement of hemodialysis quality-of-care indicators and quality-of-life scores. Am J Kidney Dis. 2009 Dec;54(6):1098-107. doi: 10.1053/j.ajkd.2009.07.017.

38. Block GA, Hulbert-Shearon TE, Levin NW, Port FK. Association of serum phosphorus and calcium x phosphate product with mortality risk in chronic

hemodialysis patients: a national study. Am J Kidney Dis. 1998 Apr;31(4):607-17.

39. Lowrie EG, Lew NL. Death risk in hemodialysis patients: the predictive value of commonly measured variables and an evaluation of death rate differences between facilities. Am J Kidney Dis. 1990 May;15(5):458-82.

40. National Kidney Foundation. K/DOQI Clinical Practice Guidelines for Bone Metabolism and Disease in Chronic Kid ney Disease.Am J Kidney Dis 42:S1-S202, 2003 (suppl 3)

41. Anees M, Hameed F, Mumtaz A, Ibrahim M, Saeed Khan MN. Dialysis-related factors affecting quality of life in patients on hemodialysis. Iran J Kidney Dis. 2011 Jan;5(1):9-14.

42. Moist LM, Bragg-Gresham JL, Pisoni RL, Saran R, Akiba T, Jacobson SH, Fukuhara S, Mapes DL, Rayner HC, Saito A, Port FK. Travel time to dialysis as a predictor of health-related quality of life, adherence, and mortality: the Dialysis Outcomes and Practice Patterns Study (DOPPS). Am J Kidney Dis. 2008 Apr;51(4):641-50. doi: 10.1053/j.ajkd.2007.12.021.

43. Fissell RB, Bragg-Gresham JL, Woods JD, Jadoul M, Gillespie B, Hedderwick SA, Rayner HC, Greenwood RN, Akiba T, Young EW. Patterns of hepatitis C prevalence and seroconversion in hemodialysis units from three continents: the DOPPS. Kidney Int. 2004 Jun;65(6):2335-42.

44. Afsar B, Elsurer R, Sezer S, Ozdemir NF. Quality of life in hemodialysis patients: hepatitis C virus infection makes sense. Int Urol Nephrol. 2009 Dec;41(4):1011-9. doi: 10.1007/s11255-009-9576-3.

45. Szmuness W, Prince AM, Grady GF, Mann MK, Levine RW, Friedman EA, Jacobs MJ, Josephson A, Ribot S, Shapiro FL, Stenzel KH, Suki WN, Vyas G. Hepatitis B infection. A point-prevalence study in 15 US hemodialysis centers. JAMA. 1974 Feb 25;227(8):901-6.

46. Ong SC, Mak B, Aung MO, Li SC, Lim SG. Health-related quality of life in chronic hepatitis B patients. Hepatology. 2008 Apr;47(4):1108-17. doi: 10.1002/hep.22138.

47. DeOreo PB. Hemodialysis patient-assessed functional health status predicts continued survival, hospitalization, and dialysis-attendance compliance. Am J Kidney Dis. 1997 Aug;30(2):204-12.

48. Kalantar-Zadeh K, Kopple JD, Block G, Humphreys MH. Association among SF36 quality of life measures and nutrition, hospitalization, and mortality in hemodialysis. J Am Soc Nephrol. 2001 Dec;12(12):2797-806.

49. Daugirdas JT. Second generation logarithmic estimates of single-pool variable volume Kt/V: an analysis of error. J Am Soc Nephrol. 1993 Nov;4(5):1205-13.

50. Jindal KK, Goldstein MB: Urea kinetic modeling in chronic hemodialysis: Benefits, problems and practical solutions. Semin Dial 8:82–85, 1988

51. Lightfoot, BO, Caruana, RJ, Mulloy, LL, Fincher, ME. Simple formula for calculating normalized protein catabolic rate (NPCR) in hemodialysis (HD) patients (abstract). J Am Soc Nephrol 1993; 4:363.

52. Division of Mental Health and Prevention of Substance Abuse, World Health Organization. Programme on Mental Health, WHOQOL user manual (WHO/MNH/ MHP/98.4. Rev.1). Geneva: WHO;1998.

53. Bowden A, Fox-Rushby JA. A systematic and critical review of the process of translation and adaptation of generic health-related quality of life measures in Africa, Asia, Eastern Europe, the Middle East, South America. Soc Sci Med. 2003 Oct;57(7):1289-306.

54. Moreno F, Aracil FJ, Pérez R, Valderrábano F. Controlled study on the improvement of quality of life in elderly hemodialysis patients after correcting end-stage renal disease-related anemia with erythropoietin. Am J Kidney Dis. 1996 Apr;27(4):548-56.

55. Burkart JM. Peritoneal dialysis should be considered as the first line of renal replacement therapy for most ESRD patients. Blood Purif. 2001;19(2):179-84.

56. Drayer RA, Piraino B, Reynolds CF 3rd, Houck PR, Mazumdar S, Bernardini J, Shear MK, Rollman BL. Characteristics of depression in hemodialysis patients: symptoms, quality of life and mortality risk. Gen Hosp Psychiatry. 2006 Jul-Aug;28(4):306-12.

57. K/DOQI Nutrition in chronic renal failure. American Journal of Kidney Diseases, Vol 35, No 6, Suppl 2 (June), 2000: pp S1-S3

58. Lowrie EG, Laird NM, Parker TF, Sargent JA. Effect of the hemodialysis prescription of patient morbidity: report from the National Cooperative Dialysis Study. N Engl J Med. 1981 Nov 12;305(20):1176-81.

59. Beusterien KM, Nissenson AR, Port FK, Kelly M, Steinwald B, Ware JE Jr. The effects of recombinant human erythropoietin on functional health and well-being in chronic dialysis patients. J Am Soc Nephrol. 1996 May;7(5):763-73.

60. Mustard CA, Kaufert P, Kozyrskyj A, Mayer T. Sex differences in the use of health care services. N Engl J Med. 1998 Jun 4;338(23):1678-83.

ANNEXURE 1 - ABBREVIATIONS

1. CKD – Chronic kidney disease
2. CKD5 – Chronic kidney disease stage 5
3. ESRD – End stage renal disease
4. MHD –Maintenance Hemodialysis
5. QOL – Quality of life
6. spKt/V – Single pool kt/V
7. e Kt/V – equilibrated kt/V
8. KDOQI - Kidney Disease Outcomes Quality Initiative
9. KDIGO - Kidney Disease: Improving Global Outcomes
10. TSAT – Transferrin saturation
11. TIBC – Total Iron binding capacity
12. nPNA - normalized protein nitrogen appearance
13. nPCR - normalized protein catabolic rate
14. Pre-BUN – Predialysis Blood Urea nitrogen
15. Ca - serum calcium
16. Pi - serum phosphorus
17. PTH – parathormone
18. Ca-P product –Calcium phosphorus product
19. HCV – Hepatitis C Virus
20. HBV – Hepatitis B Virus
21. DOPPS - Dialysis Outcomes and Practice Patterns Study

ANNEXURE 3

PROFORMA FOR THE STUDY OF DETERMINANTS OF QUALITY OF LIFE IN HAEMODIALYSIS PATIENTS

PATIENT NAME: OP NUMBER

S. NO	Variables	
1	Age	
2	Gender	
3	Educational status	
4	Marital status	
5	Annual Income – family	
6	Annual Income - Patient	
7	Employment	
8	Duration of dialysis in months	
9	Time taken to reach the centre in mts	
10	Number of times of dialysis weekly	
11	Hemoglobin level in gms %	
12	Serum Creatinine – mg/dl	
13	Blood Urea – mg/dl	
14	Serum Albumin mg/ dl	
15	Native kidney disease	
16	Comorbidities: a) Diabetes Mellitus (Yes/ No) b) Hypertension (Yes/ No) c) Hypertension (Yes/ No) d) IHD (Yes/ No)	

ANNEXURE 3

PROFORMA FOR THE STUDY OF DETERMINANTS OF QUALITY OF LIFE IN HAEMODIALYSIS PATIENTS

…….Contd

17	Serology a) Hepatitis B (Yes/ No) b) Hepatitis C (Yes/ No)	
18	Calcium in mg/dl	
19	Phosphorus mg/ dl	
20	Calcium Phosphorus product	
21	PTH in pg/ml	
22	Type of access of HD (Fistula/ Catheter)	
23	On Erythropoietin (Yes/ No)	
24	Erythropoietin dose / week	
25	Serum Ferritin (micro gm/ L)	
26	Serum Iron	
27	Serum TIBC	
28	Post dialytic weight & UF Volume	
29	Urinary Urea nitrogen	
30	Urinary Creatinine Clearance	
31	Calculated protein nitrogen appearance (nPNA)	

ANNEXURE 4 - WHOQOL BREF SCALE – TAMIL VERSION

World Health Organization

உலக சுகாதார நிறுவனம்

உங்களைப் பற்றிய சுய விவரம்

உங்களிடம் கேள்விகளை கேட்கும் முன்பாக உங்களைப் பற்றி அறிய விரும்புகின்றேன்.

சரியான பதிலை கொடுக்கப்பட்டுள்ள விடைகளில் இருந்து வட்டமிட்டு சுட்டி காட்டுக.

பாலினம் : ஆண் / பெண்

வயது :

கல்வி தகுதி : பள்ளிக்கு சென்றதில்லை / தொடக்கப் பள்ளி / நடுநிலைப் பள்ளி / மேல்நிலைப் பள்ளி

திருமணம் : ஆகவில்லை / ஆகிவிட்டது / சேர்ந்து வாழ்கின்றேன் / திருமணத்திற்குபின் பிரிந்து வாழ்கிறேன் / விவாகரத்தானவரா

கீழ்வரும் கேள்விகள் உங்களுடைய வாழ்க்கை தரக், நலம் போன்றவற்றை எவ்வாறு உணர்கின்றீர்க்ள் என்பதை பற்றியவையாகும். நான் கேள்விகளை ஒவ்வொன்றாக அதனுடைய சில பதில்களுடன் உங்களை கேட்கிறேன் அதற்கு நீங்கள் சரியான பதிலை தேர்ந்தெடுக்கவும். இதில் சரியான விடையை / பதிலை தேர்ந்தெடுக்க குழப்பழ்மென்றால் முதலில் சரி என்று உங்களுக்கு தோன்றியதே சரியாந விடையாகும்.

கடந்த 4 வாரங்களில் உங்களுடைய வாழ்வின் மதிப்பு, எதிர்பார்ப்பு மற்றும் மனநிறைவு ஆகியவற்றை நினைவில் கொள்ளவும்.

		மிகவும் மோசம்	மோசம்	நன்றாக இல்லை மோசமாக இல்லை	நன்றாக உள்ளது	மிகவும் நன்றாக உள்ளது
1	உங்களுடைய வாழ்க்கையின் தரத்தை நிங்கள் எவ்வாறு மதிப்பிடுகிறீர்கள் ?	1	2	3	4	5

		மிகவும் மோசம்	மோசம்	நன்றாக இல்லை மோசமாக இல்லை	நன்றாக உள்ளது	மிகவும் நன்றாக உள்ளது
2	உங்களுடைய உடல் ஆரோக்கியம் எவ்வளவு திருப்திகரமாக உள்ளது?	1	2	3	4	5

கீழ்கண்ட வினாக்கள், நிங்கள் கடந்த 2 வாரங்களில், சில விஷயங்களில் அணுபவித்து வந்தீர்கள் (அணுபவம் உள்ளன) என்பதை பற்றி கேட்கின்றன.

		இல்லவே இல்லை	கொஞ் மளவு	மிதமான அளவு	அதிகமான அளவு	மிகவும் அதிகமான அளவு
3	எந்தளவிற்கு உடல் வலி நிங்கள் செய்ய வேண்டியவைகளிலி ருந்து உங்களை தடுக்கிறது ?	1	2	3	4	5
4	அன்றாட வாழ்வில் செயல்பட உங்களுக்கு எந்தளவிற்கு மருத்துவ உதவி தேயைவப்படுகிறது ?	1	2	3	4	5
5	வாழ்க்கையில் எந்தளவிற்கு சந்தோஷமாக உள்ளீர்கள் ?	1	2	3	4	5
6	உங்கள் வாழ்க்கை எந்தளவிற்கு அர்த்தமுள்ளதாக உணர்கிறீர்கள் ?	1	2	3	4	5
		இல்லவே இல்லை	கொஞ் மளவு	மிதமான அளவு	அதிகமான அளவு	மிகவும் அதிகமான அளவு
7	எந்தளவிற்கு நன்றாக உங்களால் கவனம் செலுத்த முடிகிறது?	1	2	3	4	5
8	உங்களுடைய அன்றாட வாழ்வில் எவ்வளவு பாதுகாப்பாக உணர்கிறீர்கள் ?	1	2	3	4	5
9	உங்கள் சுற்றுபுறம் எந்தளவு அரோக்கியமானதா க உள்ளது ?	1	2	3	4	5

கீழ்வரும் வினாக்கள், கடந்த இரண்டு வாரங்களில் நீங்கள் எவ்வளவு முழுமையாக அணுபவித்தீர்கள் அல்லது செய்ய முடிந்த சில காரியங்களை குறிப்பன.

		இல்லவே இல்லை	கொஞ் மளவு	மிதமான அளவு	அதிகமான அளவு	மிகவும் அதிகமான அளவு
10	தினசரி வாழ்க்கையில் உங்களுக்கு போதுமான அளவு சக்தி இருக்கிறதா ?	1	2	3	4	5
11	உங்கள் உடல் தோட்றத்தை உங்களால் ஏற்றுக் கொள்ள முடிகிறதா ?	1	2	3	4	5
12	உங்கள் தேவைகளை பூர்த்தி செய்ய உங்களிடத்தில் போதுமானளவு பணம் உள்ளதா ?	1	2	3	4	5
13	தினசரி வாழ்வில் உங்களுக்கு தேவையனா தகவல்கள் எவ்வளவு தூரம் கிடைக்கிறது ?	1	2	3	4	5
14	பொதுபோக்குகளில் ஈடுபட எந்த அளவிற்கு உங்களுக்கு வாய்ப்பு கிடைக்கிறது ?	1	2	3	4	5
15	எவ்வளவு நன்றாக உங்களால் அக்கம் பக்கத்தில் போய்வரமுடிகிறது ?	1	2	3	4	5

		இல்லவே இல்லை	கொஞ் மளவு	மிதமான அளவு	அதிகமான அளவு	மிகவும் அதிகமான அளவு
16	உங்கள் தூக்கம் எவ்வளவு திருப்திகரமாக உள்ளது ?	1	2	3	4	5
17	தினசரி செயல்களில் உங்களால் எவ்வளவு திருப்திகரமாக செயல்பட முடிகிறது ?	1	2	3	4	5
18	உங்கள் வேலைத்திறன் எவ்வளவு திருப்திகரமாக உள்ளது ?	1	2	3	4	5
19	உங்களைப்பற்றி நீங்கள் எவ்வளவு திருப்திகரமாக உள்ளீர்கள் ?	1	2	3	4	5

		இல்லவே இல்லை	கொஞ் மளவு	மிதமான அளவு	அதிகமான அளவு	மிகவும் அதிகமான அளவு
20	உங்கள் தனிப்பட்ட உறவுகள் குறித்து திருப்திகரமாக உள்ளீர்களா ?	1	2	3	4	5
21	உங்கள் தாம்பத்ய வாழ்க்கை எவ்வளவு திருப்திகரமாக உள்ளது ?	1	2	3	4	5
22	உங்கள் நண்பர்களிடம் இருந்து நீங்கள் பெறும் (உதவி) ஆதரவு எவ்வளவு திருப்திகரமாக உள்ளது ?	1	2	3	4	5
23	நீங்கள் வசிக்கும் இடத்தின் நிலை உங்களுக்கு எவ்வளவு திருப்திகரமாக உள்ளது ?	1	2	3	4	5
24	மருத்துவ வசதிகள் கிடைக்கபபெறுவதில் நிங்கள் திருப்திகரமாக உணர்கிறீர்களா ?	1	2	3	4	5
25	உங்கள் போக்குவரத்து வசதி எவ்வளவு திருப்திகரமாக உள்ளது ?	1	2	3	4	5

		இல்லவே இல்லை	கொஞ் மளவு	மிதமான அளவு	அதிகமான அளவு	மிகவும் அதிகமான அளவு
26	எவ்வளவு எளிதில் நீங்கள் சோகம், விரக்தி மற்றும் மன அழுத்தம் போன்ற எதிர்மறை எண்ணங்களுக்கு உளளாகிறீர்கள் ?	1	2	3	4	5
27	இந்தப் படிவத்தை பூர்த்தி செய்ய யாராவது தங்களுக்கு உதவி செய்தார்களா ?	1	2	3	4	5

Patients' Signature:

Date:

ANNEXURE 2 - MASTER CHART

Name	Opno.	Kt /v	nPCR	D1	D2	D3	D4	Total QOL	Age	gender	education	Marital	Employment	Income	Duration	Time	No./wk	Hb	Ferritin	TSAT	NKD	DM/SHT/IHD	Serology Y / N / B /C	Ca	Pi	Ca X P	Creat	Albumin	Access	Erythrodose
RADHA	O0704660 2	0.7	2.8	11	12	16	15	54	30	F	8	M	N	72000	3	1hr30min	2	4.6	118	9.8	NK	SHT	N	8.6	5	43	10.1	3.6	C	12000U
BALAJI	O1007602 7	1.1	2.14	15	17	20	19	71	41	M	MBA	M	N	72000	15	1hr	3	11	128	22.8	DN	DM/SHT	N	7.4	6.6	48.84	8.05	4.8	F	8000U
VELLINGIRI	O0704112 5	1.2	2.64	9	12	16	12	49	76	M	4	M	N	65000	54	20min	3	9.1	181	24.5	NK	SHT/IHD	N	10	4.1	42.64	6.11	4.2	F	8000U
MANI	O1002817 2	1.3	1.5	14	15	12	13	54	43	M	12	M	E	48000	24	4hr	3	6.8	144	17.8	NK	SHT	N	9.2	5.6	51.52	13.9	4.4	F	8000U
SHANTHAMANI	O0600112 92	0.9	0.77	9	13	16	17	55	61	F	10	M	N	500000	70	20min	3	8.9	572	33.9	DN	DM/SHT	N	9.1	4.3	39.13	4.96	3.6	F	4000U
SIVAKAMI	O0800226 12	1.7	1.77	11	9	8	13	41	64	F	4	N	N	60000	46	30min	3	6.6	953	24.8	NK	SHT	N	8.1	4.3	34.83	6.75	4.4	F	N
ARUMUGAM	O0500419 28	1.6	2.54	13	9	16	11	49	47	M	10	M	N	96000	72	30min	3	9.3	373	27.3	NK	SHT/IHD	N	8.9	2.5	22.25	6.3	4.5	F	N
ANITHA	O1010654 4	1.1	2.67	10	13	11	16	50	34	F	BCOM	N	N	200000	13	30min	3	7.5	452	N	NK	SHT	N	9.3	5.1	47.43	9.19	4.2	C	8000U
BALASUBRAMANI	O1003340 4	1	2.57	11	11	13	15	50	50	M	4	M	N	60000	21	15min	4	8.5	299	17.3	DN	DM/SHT	N	9.5	2.21	21	8.45	4.1	F	N
NATARAJAN	O0302332 8	1.1	1.76	12	9	9	9	39	70	M	DIPLOMA	M	N	72000	79	3hr	2	9.6	902	58.3	DN	DM/SHT/IHD	N	9.3	3.1	28.83	5.74	3.3	F	8000U
GAYATHRI	O1009901 3	1.4	1.21	14	10	12	15	51	26	F	12	N	N	178000	14	3hr	2	8.4	337	38.2	NK	SHT	N	8.2	4.7	38.54	12.5	4.3	F	4000/
VALLIAMMAL	O0901076 7	1.7	1.16	12	15	16	11	54	51	F	N	M	N	NIL	36	2hr 30min	2	8.8	63	20.9	NK	SHT	N	8.8	6.5	57.2	8.98	4.2	F	8000U
ARUSAMY	O0600861 9	1.1	1.31	12	10	8	11	41	65	M	DIPLOMA	M	N	300000	71	1hr30min	2	8.4	770	19.9	NK	SHT	N	9.3	3.4	31.62	13.1	4.7	F	8000U
NOUFIYA	O1000836 4	1.1	1.13	13	11	16	15	55	29	F	10	M	N	100000	22	2hr 30min	2	7.6	974	19.2	NK	SHT	N	8.4	4.4	36.96	10.9	4.2	F	8000U
NATRAJ	O1006384 5	2.3	1.61	13	11	16	15	55	56	M	7	M	E	134000	5	1hr30min	2	8.5	337	N	GN	N	N	8.6	7.1	61.06	6.09	3.7	C	4000U
SEKAR	O0802524 0	1	1.13	11	11	16	14	52	50	M	6	M	E	96000	5	20min	2	6.9	410	21.8	DN	DM/SHT	N	9.9	7.8	77.22	9.38	3.7	F	4000U
PRATHAP CHANDAR	O1104297 2	1.2	1.2	11	11	19	16	57	50	M	BSc	M	E	50000	7	2hr	2	8.5	297	24.4	NK	SHT	N	9.2	4.8	44.16	13	4.1	F	8000U
PERUMALSAMY	O0909051 3	1.1	1.28	9	9	11	14	43	67	M	6	M	N	84000	40	1hr30min	2	5.2	192	19.9	DN	DM/SHT	N	8.5	6.3	53.55	16.5	3.8	F	4000U
SIVARAJ	O0903210 5	1.4	1.39	9	4	4	8	25	63	M	BA	M	N	72000	33	1hr	3	6.4	628	31.8	DN	DM/SHT	N	8.9	5.5	48.95	7.8	4.2	F	4000U

Name	Opno.	Kt/v	nPCR	D1	D2	D3	D4	Total QOL	Age	gender	education	Marital	Employment	Income	Duration	Time	No./wk	Hb	Ferritin	TSAT	NKD	DM/SHT/IHD	Serology Y/N/B/C	Ca	Pi	Ca X P	Creat	Albumin	Access	Erythrodose
SENTURAPANDIYAN	O06037976	1.1	1.2	11	11	12	11	45	72	M	3	M	N	12000	42	45min	3	6.7	484	13.7	DN	DM/SHT/IHD	N	9	5	45	8.91	3.9	C	N
SANDEEP	O11038321	0.8	1.39	12	11	11	11	45	24	M	DIPLOMA	N	E	120000	7	30min	3	6.8	158	11.9	GN	SHT	N	8.2	5.7	46.74	8.01	3.9	F	N
DHANDAPANI	O11058456	0.7	0.84	11	12	13	14	50	63	M	10	M	N	48000	5	30min	3	9	118	8.28	DN	DM/SHT	N	8.3	4	33.2	7.43	4.1	F	4000U
MANOHARAN	O09018765	1	0.99	10	10	13	16	49	50	M	9	M	N	48000	34	2hr30min	2	6.7	163	19.1	NK	SHT/IHD	N	8.9	11.1	98.79	7.5	3.7	F	N
SAMPATHKUMAR	O10094808	1.1	1.26	12	12	11	13	48	48	M	12	M	N	40000	14	2hr	2	6.4	843	58.1	NK	SHT	N	10	3.5	36.4	15.5	4.3	F	N
AMBIKA	O08033388	0.9	0.16	12	11	15	12	50	52	F	8	M	N	50000	44	1hr30min	2	11	435	16.9	DN	DM/SHT/IHD	N	9.5	7.3	69.35	8.2	4.7	F	8000U
PAUL	O07054979	1	3.43	11	13	15	13	52	60	M	9	M	E	100000	61	1hr	3	6.6	784	19.7	DN	DM/SHT	N	9	6.4	57.6	11.6	4.2	F	4000U
DHANAPAL	O07049859	0.9	2.98	11	13	12	15	51	36	M	DIPLOMA	N	E	150000	53	30min	3	9.5	133	16.2	DN	DM/SHT	N	8.5	7	59.5	8.11	3.6	F	4000U
JAGANATHAN	O10030731	1.3	2.63	11	12	9	10	42	45	M	10	M	N	87000	21	1hr	3	7.2	257	14	DN	DM/SHT	N	8.9	4.1	36.49	17.7	4.7	F	8000U
DHANABAKIYAM	O10052490	0.9	1.4	10	9	16	15	50	34	F	5	M	N	60000	9	3hr30min	2	7.4	1.6	12.5	NK	SHT	N	8.5	4.5	38.25	8.95	3.8	F	N
THANGAVEL	O11077108	0.9	0.95	11	10	9	12	42	45	M	5	M	N	72000	4	2hr15min	2	8.6	210	24.9	ADPKD	NIL	N	8.5	5.6	47.6	9.76	3.9	C	4000U
SAVITHIRI	O08002880	1.8	1.68	11	9	13	16	49	52	F	8	M	N	60000	6	2hr	2	6.9	507	22.2	NK	SHT	N	9.7	5.83	56.55	9.44	4.3	F	8000U
UMACHANDRAN	O11065588	1	0.96	14	14	15	13	56	45	M	8	M	N	NIL	6	30min	2	9.8	496	68	DN	DM/SHT	N	8.7	4.1	35.67	10.5	4.2	C	4000U
SARASWATHI	O07016565	1.7	1.63	11	10	13	12	46	48	F	8	M	N	34000	72	2hr	2	6.6	##	26.9	NK	SHT	N	8.4	6.4	53.76	9.48	4	F	1000U
GOVINDAMMAL	O07002162	1.6	1.59	11	10	16	11	48	57	F	NK	M	N	96000	57	1hr30min	2	5.9	179	35	NK	SHT	N	8.4	3.88	32.44	8.91	4.2	F	N
LAWRANCE	O10029140	1.1	1.7	13	13	15	13	54	29	M	10	M	E	72000	21	20min	3	5.6	103	16	NK	SHT	N	8.9	5.2	46.28	11.4	4.5	F	6000U
JACOB	O10041925	1.2	0.98	11	11	16	12	50	36	M	10	N	N	96000	9	5hr	2	7.4	274	N	GN	SHT	N	9.9	6.2	61.38	9.66	4.1	F	4000U
USHA	O09022579	1.2	0.96	9	9	12	15	45	36	F	12	M	N	60000	34	45min	2	8.3	628	21.8	NK	SHT	N	7.5	6.1	45.75	8.33	3	F	4000U
VASANTHI	O11016397	1	2.07	9	8	11	10	36	43	F	12	M	N	36000	9	3hr	3	5.8	297	N	GN	SHT	N	9.4	4.5	42.3	8.99	3.9	C	6000U
MEENACHISUNDARAM	O10011558	1.3	1.14	9	13	13	16	51	53	M	BE	M	N	240000	23	30min	3	9.4	691	25.4	DN	DM/SHT	N	7.4	5.1	37.74	5.98	3.6	F	8000U
JAYARAJ	O08008576	1.2	1.28	9	11	5	13	38	72	M	8	N	N	NIL	36	45min	2	8	666	21.6	DN	DM/SHT	N	6.5	9.2	59.8	11.8	4.3	F	N

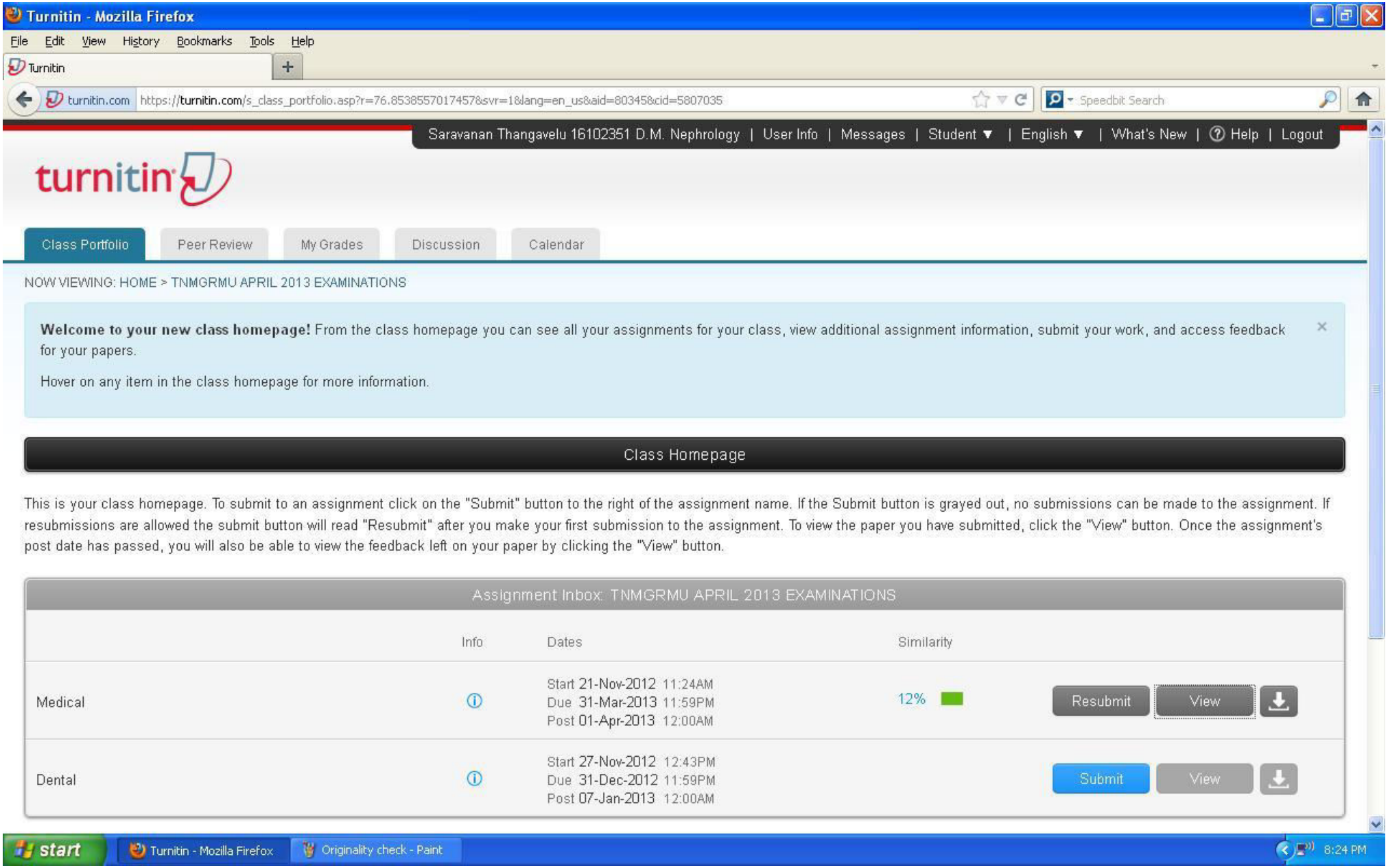
Name	Opno.	Kt/v	nPCR	D1	D2	D3	D4	Total QOL	Age	gender	education	Marital	Employment	Income	Duration	Time	No./wk	Hb	Ferritin	TSAT	NKD	DM/SHT/IHD	Serology Y/N/B/C	A	Pi	Ca X P	Creat	Albumin	Access	Erythrodose
DHAMODHARAN	O10027282	1.2	1.26	11	11	11	11	44	32	M	ME	N	N	140000	17	10min	2	9.1	674	30.9	NK	SHT	N	9.2	3	27.6	10.5	4.3	F	4000U
KANCHANA	O10063827	1.5	1.39	12	13	11	12	48	62	F	10	M	N	60000	18	20min	2	8.5	451	34.6	DN	DM/SHT	N	10	3.4	34.34	7.38	3.8	F	4000U
VIJAYAKUMAR	O09017121	1.2	1.23	12	11	13	16	52	49	M	5	M	N	120000	24	30min	2	8.7	50	27.4	DN	DM/SHT	N	6.4	6.4	40.96	15.5	4.3	F	N
SELVARAJ	O10023627	0.8	1.04	10	9	7	9	35	30	M	7	N	N	24000	42	3hr	2	7.6	468	35.5	NK	SHT	N	8.4	3.6	30.24	13.3	4.8	F	4000U
MEGANATHAN	O08035915	1.3	1.48	13	13	16	10	52	33	M	9	M	E	72000	44	1hr15min	2	6.4	125	15.1	NK	SHT	N	6.5	5.6	36.4	13.7	4.1	F	4000U
SEKAR	O11036038	1.1	0.78	11	9	13	12	45	55	M	N	M	N	48000	8	3hr	2	6.9	285	26.2	GN	SHT	N	8.8	4.2	36.96	7.35	4.6	F	1000U
MADHANAGOPAL	O05031996	1	1.32	9	11	5	11	36	55	M	10	M	N	45000	34	2hr30min	2	5.3	459	22	DN	DM/SHT	N	6.5	5.2	33.8	8.25	4	F	4000U
SUSEELA	O11024096	1.4	1.17	12	10	16	13	51	28	F	12	M	N	48000	10	45min	2	7.8	584	39.7	NK	SHT	N	8.3	6.7	55.61	6.43	3.8	F	8000U
VENKATAPATHY	O07050939	0.9	0.91	13	11	16	15	55	56	M	10	M	N	100000	27	10min	2	6.9	17	11.6	DN	DM/SHT/IHD	N	7.7	6.7	51.59	13.38	4.1	F	8000U
SIVASHANMUGAM	O06039021	0.9	1.04	13	12	9	11	45	52	M	10	M	E	120000	6	30min	2	8.9	225	31	DN	DM/SHT	N	8.2	4	32.8	7.49	3.5	C	N
Mr. Ranganayagam	O09003825	1.2	2.39	10	8	12	11	41	71	M	M.A	M	N	200,000	31	30min	3	7.5	503	21.3	DN	DM/SHT/IHD	N	7.7	1.4	10.78	8.11	3.8	F	4000U
Ms. Indharani	O09105966	1.4	1.32	14	12	11	12	49	27	F	12	N	N	120,000	25	15min	2	7.7	317	27.3	not known	SHT	N	8.3	5.73	47.73	11.4	4	F	8000U
Mrs. Vijayabharathi	O09033331	1.4	1.27	15	11	16	17	59	45	F	10	M	N	80000	3	30min	2	6	132	20.3	GN	SHT	N	8.3	6.7	55.61	10.4	4	F	12000U
Mr. Murali Rao	O11072926	1	1.14	14	12	16	12	54	42	M	10	M	N	24000	3	2hrs	2	7	397	18.6	DN	SHT/DM	N	8.1	4.2	34.02	7.24	3.9	C	4000U
Mrs. Selvi	O11048580	1.2	1.88	15	17	16	14	62	47	F	10	M	N	84000	6	45min	3	11	123	18.1	not known	SHT	N	7.8	9.9	77.22	5.95	3.6	F	8000U
Mrs. Dhanalakshmi	O11020918	0.7	1.02	12	14	15	13	54	42	F	0	M	N	120000	10	1hr	2	6.8	163	20.3	not known	SHT	N	8.3	3.7	30.71	11.2	4.2	F	8000U
Mr. Natarajan	O06044006	0.9	2.33	9	7	5	5	26	55	M	10	M	N	120000	51	30min	3	6.1	19	6.62	not known	SHT	N	9.2	7.3	67.16	8.33	4.2	F	8000U
Mr. Rangasamy	O03029065	0.9	2.24	14	14	15	16	59	78	M	5	M	N	10000	4	30min	3	7	115	13.9	not known	SHT/IHD	N	9.3	5.5	51.15	8.12	4.1	F	8000U

Name	Opno.	Kt/v	nPCR	D1	D2	D3	D4	Total QOL	Age	gender	education	Marital	Employment	Income	Duration	Time	No./wk	Hb	Ferritin	TSAT	NKD	DM/SHT/IHD	Serology Y/N/B/C	Ca	Pi	CaXP	Creat	Albumin	Access	Erythrodose
Mr. Shanthappan	O11020452	1.1	2.75	9	12	16	13	50	50	M	0	M	N	36000	10	1hr30min	3	9.5	178	20.1	GN	SHT	N	8.3	8.3	68.89	11.6	3.6	F	8000U
Mr. Natchimuthu	O09016647	3.3	2.62	13	12	9	13	47	62	M	0	M	N	10000	8	2hrs	3	8.8	194	22.9	not known	SHT	N	8.9	6.2	55.18	14	4.6	F	8000U
Mr. Shanmugam	O10032681	1.5	2.33	11	9	11	10	41	39	M	10	M	E	200000	13	20min	3	14	241	29	not known	SHT	N	8.3	4.9	40.67	13.4	4.4	F	8000U
Mrs. Abibunisha	O09082713	1.3	0.86	11	13	11	11	46	60	F	5	M	N	40000	21	15min	2	8.6	69	15.3	not known	SHT	N	8.3	3.3	27.39	8.66	3.7	F	2000U
Mrs. Vennilamani	O06013049	1.3	1.35	11	11	8	12	42	64	F	8	M	N	10000	63	1hr	2	5.8	951	15.2	not known	SHT	N	9.9	6.9	68.31	13.4	4.4	F	N
Mrs. Kannammal	O08039153	1.1	1.3	10	9	11	12	42	52	F	4	M	N	40000	42	1hr30min	2	4.7	>2000	N	GN	SHT/IHD	N	9.4	6.9	64.86	6.95	3.8	F	6000U
Mr. Jawahar	O10043985	1.5	0.91	10	11	15	12	48	42	M	BA	M	E	80000	17	4hrs15min	2	8.8	162	21.2	others	SHT	N	9.1	5.3	48.23	6.9	3.5	F	2000U
Mr. Chinnappan	O11027109	1.1	1	15	13	16	15	59	60	M	7	M	N	240000	9	30min	2	6.2	157	31.1	PKD	SHT	N	8.8	3.4	29.92	5.46	4.1	F	4000U
Mr. Selvakumar	O09069652	1.1	1.61	13	16	17	14	60	23	M	9	M	E	36000	3	4hrs	2	6.1	426	9.96	not known	SHT	N	7.9	9	71.1	14	4.3	C	N
Mr. Shankar	O12051336	0.5	0.68	13	11	16	13	53	34	M	6	M	N	100000	6	1hr	2	6.1	449	16.8	not known	SHT	N	8.9	5.9	52.51	10.3	3.8	F	8000U
Mr. Velmurugan	O10021341	1.3	1.57	18	18	16	13	65	34	M	8	M	N	30000	17	1hr30min	3	5.9	539	41.5	not known	SHT	N	8.6	6.5	55.9	11.9	4.2	F	N
Mrs. Jagathambal	O10090239	1.6	1.32	11	10	15	11	47	47	F	7	M	N	180000	14	1hr 30min	2	9.1	340	20.7	GN	SHT	N	8.6	3.4	29.24	10.1	3.9	F	4000U
Mr. Murugesan	O09055314	1.2	1.06	10	12	5	10	37	44	M	12	M	N	40000	4	2hr30min	2	8.1	417	26.9	DN	SHT/DM	N	8.8	6.5	57.2	9.89	4	F	N
Mrs. Mahalakshmi	O10068865	1.1	1.8	13	13	9	13	48	41	F	10	M	N	50000	17	1hr30min	3	7.8	327	N	GN	SHT	N	8.7	4	34.8	9.03	4.1	F	N
Mrs. Selvi	O11003724	1.6	1.16	10	10	9	9	38	51	F	8	M	N	15000	12	1hr30min	2	7.9	234	N	GN	SHT	N	9	6.6	59.4	8.69	3.2	F	8000U
Mrs. Saraswathi	O07011450	1.6	1.65	10	11	9	12	42	57	F	5	M	E	60000	32	1hr	2	10	501	37.1	not known	SHT	N	8.7	4.7	40.89	9.69	4.2	F	4000U

Name	Opno.	Kt/v	nPCR	D1	D2	D3	D4	Total QOL	Age	gender	education	Marital	Employment	Income	Duration	Time	No./wk	Hb	Ferritin	TSAT	NKD	DM/SHT/IHD	Serology Y / N / B /C	Ca	Pi	Ca X P	Creat	Albumin	Access	Erythrodose
Mrs. Azhagusundaravalli	O06041249	1	0.82	11	11	13	14	49	61	F	MBBS	M	N	300000	64	1h15min	2	6.5	802	20.8	DN	SHT/DM	N	9.3	2.5	23.25	7.83	4.1	F	8000 U
Mr. Thangavelu	O10048562	1.3	0.73	12	10	9	10	41	29	M	12	M	N	70000	20	45min	2	9.6	178	26	not known	SHT	N	9.7	5.9	57.23	3.48	4.7	F	N
Mr. Mohan	O09028323	1	1.23	11	11	11	12	45	50	M	8	M	E	72000	34	30min	3	8.3	276	22.7	not known	SHT	N	9	6.7	60.3	8.68	4.5	F	4000 U
Mr. Arumugam	O09091704	1.4	1.35	14	14	12	13	53	51	M	6	M	E	60000	26	2hrs	2	12	1175	25.9	not known	SHT	N	7.9	7.5	59.25	15.4	4.6	F	4000 U
Mrs. Saraswathi	O10095529	1.6	1.53	11	9	7	10	37	51	F	4	M	N	72000	14	3hrs	2	6.9	427	26.4	not known	SHT	N	9	8.8	79.2	13.6	4.1	F	2000 U
Mrs. Poongodi	O10024744	1.4	1.62	10	13	13	14	50	34	F	10	M	N	50000	22	3hrs	2	7	323	18.5	not known	SHT	N	8.1	4.4	35.64	13.9	4.2	F	N
Mr. Samy Thangavel	O07033203	1.2	1.33	11	12	15	13	51	59	M	10	M	N	120000	19	4hrs	2	8.2	98	11	DN	SHT/DM	N	8.2	6.8	55.76	8.68	4.5	F	N
Mrs. Shanthamani	O07013234	0.6	1.98	14	14	16	15	59	56	F	10	M	N	100000	58	10min	3	7.5	982	45	not known	SHT	N	5.4	9.2	49.68	12.5	3.9	F	N
Mr. V. Arumugam	O10017630	0.9	2.22	9	12	9	9	39	36	M	10	M	N	50000	16	2hrs30min	3	8.9	45	6.52	not known	SHT	N	8.7	6.5	56.55	7.47	3.9	F	8000 U
Mr. Sudhakaran	O08067124	1.3	1.43	11	13	9	14	47	54	M	BA	N	N	9600	40	45min	3	11	669	32.7	not known	SHT/IHD	N	9.1	4.3	39.13	9.08	4.5	F	4000 U
Mrs. Selvi	O97035661	1.5	1.38	13	11	12	14	50	40	F	7	M	N	60000	174	30min	2	13	>2000	N	not known	SHT	B	9.1	5.4	49.14	8.18	2.9	F	4000 U
Mr. Ravichandran	O11053263	1.1	2.42	13	9	7	8	37	36	M	2	M	N	15000	6	20min	3	7.7	980	N	DN	SHT/DM	B	9.2	4.3	39.56	11.8	4.5	F	8000 U
Mr. Sundaramoorthy	O09088384	1.5	2.39	14	12	15	11	52	36	M	CLIS	M	E	120000	22	2hrs	3	7.5	##	N	not known	SHT	B	6.3	3.5	22.05	11	4.4	F	8000 U
Mr. Arumugam VR	O09056246	1.4	2.22	4	7	9	11	31	51	M	9	M	N	33600	30	2hrs	3	7.3	36	N	not known	SHT	B	7.4	4.6	34.04	7.74	3.4	F	2000 U
Mr. Saleem basha	O11071940	0.9	0.98	11	12	11	10	44	33	M	BA	M	N	100000	12	2hrs30min	2	6.1	877	N	DN	SHT/DM	B	4.6	8.9	40.94	8.05	3.8	F	8000 U

Name	Opno.	Kt/v	nPCR	D1	D2	D3	D4	Total QOL	Age	gender	education	Marital	Employment	Income	Duration	Time	No./wk	Hb	Ferritin	TSAT	NKD	DM/SHT/IHD	Serology Y/N/B/C	Ca	PI	Ca X P	Creat	Albumin	Access	Erythrodose
Mr.Govindharaj	O10097415	1.1	1.07	10	12	12	11	45	55	M	10	M	N	36000	12	30min	2	9	125	N	DN	SHT/DM	B	8.8	5.7	50.16	8.2	4.2	F	8000U
Mr. Chinnasamy	O07060273	2	1.15	12	13	12	14	51	61	M	5	M	E	10000	52	30min	3	9.9	839	N	DN	SHT/DM	C	7.9	3.3	26.07	7.52	4.3	F	N
Mr. Chelladurai	O10048703	0.9	1.07	15	13	15	14	57	52	M	7	M	N	36000	19	1hr15 min	2	8.2	235	N	not known	SHT	C	6.5	6.7	43.55	8.42	4.3	F	N
Mr. Sathishkumar	O11029550	1.2	1.65	11	13	15	12	51	30	M	10	M	E	240000	7	1hr	3	7.5	73	N	not known	SHT	C	9.2	6.4	58.88	8.45	4.4	F	8000U
Mr. Gunasekaran	O02041619	1.1	2.56	14	13	8	13	48	34	M	10	M	E	100000	91	1hr30 min	3	10	##	N	not known	SHT	C	10	6.6	66.66	11	4.5	F	N
Mrs. Angammal	O06033021	1.6	1.43	12	13	13	13	51	60	F	10	M	N	360000	66	1hr	3	9.6	778	N	not known	SHT	C	10	3.3	34.32	8.17	3.7	F	8000U
Mr.Dharmaraj	O10029853	1.7	0.94	10	9	12	9	40	24	M	B.COM	N	E	84000	15	30min	2	5.6	33	N	DN	SHT/DM	C	7.7	4.5	34.65	4.96	2.5	C	8000U
Mr.Thangarasu	O09004459	1.3	0.94	11	9	7	12	39	52	M	10	M	N	100000	15	3hrs	2	8	291	N	not known	SHT	C	7.5	6.2	46.5	13.2	3.9	F	4000U
Mr.Venugopal	O10023713	0.9	1.64	12	11	15	13	51	64	M	0	M	N	120000	22	1hr	3	11	520	N	DN	SHT/DM	C	9	6.3	56.7	10.7	4.2	F	N
Mr.Kirubanandham	O05041570	1	1.21	14	12	9	14	49	35	M	ITI	M	E	50000	44	1hr	3	6.4	125	N	not known	SHT	C	6.4	4.1	26.24	10.5	4	F	N
Mr.Gopal	O01045815	1.2	1.2	13	10	12	15	50	61	M	9	M	N	130000	36	1hr30 min	3	10	109	N	DN	SHT/DM	C	8.8	6.1	53.68	7.71	3.7	F	8000U
Mr.Gopal raj	O10054725	1.2	1.69	9	9	11	10	39	60	M	10	M	N	60000	6	45min	3	10	302	N	DN	SHT/DM	C	9.2	3.4	31.28	6.48	3.9	F	8000U
Mrs.Kaliammal	O06040243	1.1	2.29	11	11	9	14	45	67	F	10	M	N	100000	71	45min	3	9.6	178	N	DN	SHT/DM	C	8.6	3.8	32.68	5.09	3.4	F	N
Mr.Yuvaraj	O10081693	1.3	1.01	12	11	9	9	41	47	M	5	M	N	60000	20	45min	2	6.9		N	not known	SHT	C	8.9	7.2	64.08	4.45	4.2	F	N
Mr. Chinnasamy	O07060273	2	1.15	12	13	12	14	51	61	M	5	M	E	10000	52	30min	3	9.9	839	N	DN	SHT/DM	C	7.9	3.3	26.07	7.52	4.3	F	N
Mr.Sharif	O09077352	1.4	1.53	15	13	15	15	58	37	M	10	M	N	250000	28	2hrs	2	7.6	461	N	not known	SHT	C	9.8	6.5	63.7	11.9	4.6	F	8000U

AIM & INTRODUCTION


Turnitin - Mozilla Firefox
File Edit View History Bookmarks Tools Help
Turnitin
turnitin.com https://turnitin.com/s_class_portfolio.asp?r=76.8538557017457&svr=1&lang=en_us&aid=80345&cid=5807035
Speedbit Search
Saravanan Thangavelu 16102351 D.M. Nephrology | User Info | Messages | Student ▼ | English ▼ | What's New | Help | Logout
turnitin
Class Portfolio
Peer Review
My Grades
Discussion
Calendar
NOW VIEWING: HOME > TNMGRMU APRIL 2013 EXAMINATIONS
Welcome to your new class homepage! From the class homepage you can see all your assignments for your class, view additional assignment information, submit your work, and access feedback for your papers.
Hover on any item in the class homepage for more information.
Class Homepage
This is your class homepage. To submit to an assignment click on the "Submit" button to the right of the assignment name. If the Submit button is grayed out, no submissions can be made to the assignment. If resubmissions are allowed the submit button will read "Resubmit" after you make your first submission to the assignment. To view the paper you have submitted, click the "View" button. Once the assignment's post date has passed, you will also be able to view the feedback left on your paper by clicking the "View" button.
Assignment Inbox: TNMGRMU APRIL 2013 EXAMINATIONS
Info
Dates
Similarity
Medical
Start 21-Nov-2012 11:24AM
Due 31-Mar-2013 11:59PM
Post 01-Apr-2013 12:00AM
12%
Resubmit
View
Dental
Start 27-Nov-2012 12:43PM
Due 31-Dec-2012 11:59PM
Post 07-Jan-2013 12:00AM
Submit
View
start
Turnitin - Mozilla Firefox
Originality check - Paint
8:24 PM